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FEASIBILITY STUDY AND REMEDIAL ACTION PLAN STATION NO. 24 WORLD OIL MARKETING COMPANY 13013 SAN PABLO AVENUE SAN PABLO, CALIFORNIA

April 14, 2005

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STATION NO. 24
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1.0 INTRODUCTION

Geologic Services Corporation (GSC), on behalf of World Oil Marketing Company (World), has prepared this Feasibility Study and Remedial Action Plan (FS/RAP) for Station No. 24, located at 13013 San Pablo Avenue, in San Pablo, California. Figure 1 is a site location map showing the general location of the site. Figure 2 is a site plan showing the current layout of the site. Per Title 23 of the California Code of Regulations, Chapter 16, Article 11, §2722 through 2725, this FS/RAP presents the rationale and methodologies for source removal, and corrective action at the site. This work is proposed in response to a telephone conversation between the San Francisco Bay Regional Water Quality Control Board (SFRWQCB), and GSC on March 19, 2003. During that conversation, the SFRWQCB stated that based on a recently completed Human Health Risk Assessment (HHRA) for the above-referenced site, no corrective action would be necessary at this time. However, the SFRWQCB will require on-going quarterly groundwater monitoring and sampling as long as dissolved phase hydrocarbons that are present beneath the site exist above State Maximum Contaminant Levels (MCLs). GSC, on behalf of World, indicated that implementation of site remediation would likely be more cost effective in the long term than on-going monitoring and sampling only, particularly if remediation will be necessary when at some future date, there is a change in intended site use. World has performed a feasibility study to evaluate the various soil and groundwater remedial alternatives for the site and to compare the projected cost of the best alternative to on-going groundwater monitoring and sampling (GWM&S). This report presents the results of the feasibility study and the corrective action plan.

2.0 PURPOSE

Through remediation of the site, World intends to significantly reduce long-term costs associated with on-going groundwater monitoring, minimize impact to future station operations and surrounding residential and commercial properties and expedite the remedial process toward site closure. The recommended activities detailed herein to achieve these goals are as follows: 1) install high-vacuum dual-phase extraction (HVDPE) wells in the areas of residual hydrocarbon impact to remediate residual hydrocarbons beneath the site; 2) complete HVDPE and other tests as necessary and reporting; 3) connect existing subsurface conveyance piping from a central manifold location behind the station to each of the installed remediation wells; and 4) implement full-scale soil and groundwater remediation based on the results of the pilot tests.

Remediation of the site is proposed not only as a significant long-term cost savings but also to ensure a safer environment for existing and future developments at and near the site. A Human Health Risk Assessment (HHRA) completed in May 2002 for the site concluded that chemicals present at the site do not pose a significant risk under continued commercial land use or during activities associated with potential future site redevelopment and use. However, it is possible that in the future the site or the property immediately downgradient of the site could be redeveloped for residential use (see Site Vicinity Map, Figure 3). Therefore, a properly planned site remediation can minimize not only future station disruptions/closure and unnecessary expenditures but also prevent the potential migration of contaminants onto the commercial and residential blocks surrounding the site. Remediating the site while the bulk of the contamination is located beneath the site will be the most cost-effective strategy, as the cost of remediation will only increase if the plume migrates over time. Costs for quarterly GWM&S are estimated at $18,000 per year and installation, operation and maintenance of a remediation system, including GWM&S, to achieve site closure is estimated at $221,210 total. Thus the total cost of site remediation is equivalent to approximately 12 years of quarterly GWM&S alone. Table 1 provides a cost comparison of ongoing GWM&S versus the estimated cost to remediate the site to closure. While it appears that it is more cost effective to refrain from site remediation, other costs not shown in Table 1 will likely be incurred if the site is not remediated in a timely

manner. If contamination beneath the site does not naturally attenuate in place over time, site cleanup would be required at a future date. As the plume migrates over time, additional wells may need to be installed off site to maintain an accurate delineation of the plume and additional risk assessment may need to be performed. It is expected that over time, the costs associated with ongoing quarterly GWM&S and future site remediation will exceed the cost of implementing site remediation now.

Based upon hydrogeologic conditions at the site, historical assessment data, and a completed feasibility matrix evaluation, the recommended corrective action consists of the following phased approach:

1) SFRWQCB approval of this FS/RAP, including any necessary agency modifications;
2) Preparation of a site and task-specific Health and Safety Plan for the proposed activities;
3) Installation of two HVDPE wells northeast of MW-6 where the TPHg concentration is highest for use during feasibility testing and subsequent soil and groundwater remediation of residual hydrocarbons;
4) HVDPE and other testing if necessary and reporting to obtain soil/groundwater and engineering design parameters for equipment selection/sizing and remediation calculations;
5) Preparation of a detailed report containing well installation and feasibility testing methodologies and results;
6) Remediation system design and permitting; and
7) Implementation of site remediation.

Site information and details for the planned activities are presented in the following sections for agency consideration and approval.

3.0 SITE LOCATION AND DESCRIPTION

The site is currently an active gasoline retail station located at 13013 San Pablo Avenue, at the northwest corner of the intersection with Lowell Avenue in San Pablo, California (see Figure 1). The site is covered entirely in either concrete or asphalt and contains four 12,000-gallon fiberglass gasoline underground storage tanks (USTs) located within the central portion of the site. Three product dispenser islands are located under a canopy on the eastern portion of the site, and a station building is located on the western side of the property. Driveway easements are present on the southern and eastern boundaries of the site (see Figure 2).

4.0 PRIOR SITE INVESTIGATIONS AND ACTIVITIES

The following background information is from prior reports prepared by NMWW, Inc and GSC. A list of references is provided in Section 12.0. Appendix A contains the drill logs for all groundwater monitoring wells installed on and off site to date. Refer to Figure 2 for soil boring and well locations.

In August 1999, Environmental Science & Engineering, Inc. (ESE) performed a pre-tank removal assessment at the site under World's direction. The assessment included the completion of ten geoprobe borings B-1 through B-10 in the vicinity of the station's underground storage tanks (USTs) and pump

islands at the north and south ends of the station area. Figure 2 shows the boring locations. Each boring was advanced to a total depth of 20 feet below ground surface (bgs). ESE prepared a report of findings entitled Pre-Tank Pull Assessment dated October 11, 1996. The assessment showed that hydrocarbon impacted soil below 10 feet bgs existed in borings B-3, B-4, B-5 and B-7. The highest concentration of total petroleum hydrocarbons as gasoline (TPHg) found during the investigation was 220 milligrams per kilogram (mg/kg) found in boring B-7 at 20 feet bgs. The highest benzene concentration found was 0.18 mg/kg in boring B-3 at 20 feet bgs, and the highest methyl tertiary-butyl ether (MTBE) concentration found was 2.0 mg/kg in boring B-3 at 20 feet bgs. ESE identified a perched water zone consisting of moist to wet soils at a depth of 18-20 feet bgs in borings B-2, B-3, B-4 and B-10.

World contracted The Mark Group, Inc. (TMG) to oversee UST replacement at the site during station reconstruction. UST replacement activities were conducted from October 1997 through January 1998. Four steel gasoline USTs, twelve product dispensers and associated product and vent piping were removed and four new double-walled fiberglass USTs, new dispensers and new double-walled fiberglass piping were installed during that period. The steel USTs that were removed reportedly had no holes. Soil samples were collected from the bottom of the UST pit beneath the location of the tank ends from beneath the three pump islands. The highest TPHg concentration found beneath the UST pit was 9,400 mg/kg in sample T1-2 from beneath the west end of the northernmost tank. The highest TPHg concentration found in the vicinity of the pump islands was 1,500 mg/kg from beneath the middle pump island. The highest benzene concentration found in verification samples was 6.6 mg/kg in sample T1-2. The highest MTBE concentration found in verification samples was 13 mg/kg in sample T2-2 from beneath Tank 2. An estimated total of 3,321 tons of hydrocarbon-impacted soil was excavated during the station reconstruction, 3,200 tons of which were transported as a non-hazardous waste to a sanitary landfill for proper disposal. The remaining 121 tons of soil were transported and properly disposed of as a California (non-EPA) hazardous waste. During reconstruction, subsurface conveyance piping was installed at the site for possible use in a future remediation system.

NMWW performed an initial Phase II assessment at the site in April 1999 in response to a letter sent by the SFRWQCB to World dated January 8, 1999. After installing two wells on site a decision was made to delay further field work due to unanticipated subsurface conditions. One well (MW-1) had been screened within the previously identified perched water zone at 18 to 20 feet bgs but did not produce any water. The second well, MW-2, was drilled deeper as no shallow perched or wet zone was encountered and the uppermost saturated zone beneath the site was encountered in a fractured clay at about 28 feet bgs.

Only two of the soil samples collected during the drilling of wells MW-1 and MW-2 contained detectable TPHg concentrations. Those samples were at 30.5 feet and 25.5 feet bgs from well MW-1, containing 2,790 and 0.54 mg/kg, respectively. None of the soil samples collected contained detectable concentrations of benzene or MTBE.

Upon evaluation of the newly collected field data, NMWW submitted an *Addendum to Work Plan* to the SFRWQCB dated April 16, 1999. After discussing the proposed changes to the original workplan with the SFRWQCB, World submitted a Revised Addendum to Work Plan to the SFRWQCB dated July 7, 1999. After further discussions, the SFRWQCB issued a letter to World dated November 16, 1999. In that letter the SFRWQCB stated that, "there is presently no credible evidence to suggest that the underlying groundwater at the site is impacted by petroleum hydrocarbons." In order to show credible evidence of petroleum-impacted groundwater beneath the site, World contracted NMWW to install two additional on-site groundwater monitoring wells in July 2000. The wells were installed to depths of 38 and 40 feet, respectively, and groundwater was initially encountered at 30 feet bgs in fractured clay or interlayered clay and clayey sand. Laboratory analytical results from soil samples collected during drilling showed the

highest TPHg concentration of 1,600 mg/kg at a depth of 35.5 feet in well MW-3. The highest benzene and MTBE concentrations of 13 mg/kg and 15 mg/kg, respectively, were also found in that soil sample.

On August 27, 2001, NMWW supervised the drilling and soil sampling of two on-site borings for installation of groundwater monitoring wells MW-5 and MW-6. The wells were installed to depths of 40 feet bgs and sampling was done at five-foot intervals. Of the sixteen samples analyzed for TPHg, BTEX, and MTBE, only one sample, soil sample MW5-40 collected at 40 feet bgs, contained detectable concentrations. The sample contained 1.9 mg/kg of TPHg, 0.019 mg/kg of benzene and no detectable MTBE.

May 22, 2002 a Baseline HHRA was completed for the site per direction of the SFRWQCB. The objective of the risk assessment was to evaluate the potential health risks to current and potential future users of the site based on existing environmental conditions. The findings of the risk assessment concluded the following:

- The estimated potential adverse health impacts to current potential future commercial industrial users are well below the preliminary risk management goals for hazards, risk, and lead exposures.
- The noncarcinogenic hazard to hypothetical off-site residential receptors is well below preliminary risk management goals.
- The carcinogenic risks for off-site resident adults and children are within the 10^{-4} (1 in 10,000) to 10^{-6} (1 in 1,000,000) risk management goal stipulated by the EPA and below the Proposition 65 mandated risk management goal of 10^{-5} (1 in 100,000).
- The estimated carcinogenic risks to hypothetical off-site residents are driven by the volatilization of benzene from groundwater. In light of the conservative models and assumptions used, the estimated carcinogenic risks associated with the hypothetical off-site residential land use scenario do not appear to be significant.

On September 4, 2002, NMWW supervised the drilling and soil sampling of two off-site borings for installation of groundwater wells MW-7 and MW-8. These wells were installed to assess the latter extent of groundwater contamination down gradient of the site. The locations of the wells are in the City of Richmond because the City of San Pablo does not allow the installation of wells within public roadways. The wells were drilled to a maximum depth of 41.5 feet and groundwater was encountered at a depth of approximately 25 feet bgs in both borings during drilling. Eight soil samples were collected and sent to the laboratory for evaluation of TPHg, benzene, toluene, ethyl-benzene and total xylenes (BTEX) and methyl tertiary-butyl ether (MTBE). Concentrations of these substances were not detected above laboratory reporting limits in any of the samples.

The most recent groundwater monitoring and sampling event was performed by GSC on February 10, 2005. Groundwater levels were found at depths of 19.92 to 24.56 feet bgs. Groundwater flow direction was to the northwest at a gradient of 0.012 ft/ft. Dissolved-phase TPHg concentrations in the on-site wells ranged from not detected above the respective detection limit to 26,000 micrograms per liter (µg/L, in MW-3). Benzene concentrations in the wells ranged from non-detect to 660 µg/L (MW-3). Dissolved-phase MTBE in the on-site wells ranged from non-detect to 24 µg/L (MW-4). A copy of the *Quarterly Monitoring and Status Report, First Quarter 2005* is included in Appendix B for reference.

5.0 GEOLOGY AND HYDROGEOLOGY

5.1 GENERAL AND SITE SPECIFIC GEOLOGY

The site is located within the Coast Ranges geomorphic province along the western margin of the Berkeley Hills. The site is underlain in the near-surface by Quaternary-aged alluvium (alluvial fan deposits) consisting of unconsolidated, moderately sorted clay, silt, sand and gravels.

Soil borings drilled on site have shown the site to be underlain predominantly by thick layers of clay and silt with occasional thin lenses of sand, sandy silt, silty sand and clayey sand to the maximum drilling depth of 40 feet.

5.2 GENERAL AND SITE SPECIFIC HYDROGEOLOGY

In general, groundwater regionally moves from the uplands west toward San Francisco Bay with local variations (e.g., movement toward creeks). The nearest surface water body to the site is Wildcat Creek which is located about 800 feet northeast of the site. Previous drilling at the site showed groundwater at approximately 18- to 20-feet depth in some locations, but subsequent drilling showed that while moist to wet sediments exist at that depth beneath some areas of the site, that wet zone is not continuous across the site and does not appear to yield sufficient water to be classified as a perched aquifer.

During drilling by NMWW at the site, groundwater was generally encountered in fractured clay or interlayered clay and sand. First-encountered groundwater was found at about 28 to 30 feet bgs throughout the site except for the southwest corner of the northwest portion of the site at location MW-5. There the first-encountered groundwater was at about 35 feet bgs. Groundwater was first encountered in the two off-site well borings west of the site at about 29.5 and 31.5 feet, respectively.

A zone of interlayered wet sands, silts and clays was encountered at a depth of 18 to 20 feet in the northeast corner of the site, but a well that was screened in that zone did not produce any water. Saturated silty sand existed below the perched wet zone at 29 feet bgs, and was separated from it by nine feet of silt and clay. Shallow sandy lenses encountered in other areas of the site did not generally appear saturated. The groundwater gradient beneath the site has been shown to be approximately 0.01 foot/foot to the west. Groundwater beneath the site therefore appears to flow away from Wildcat Creek.

During this and prior investigations, the site and area downgradient of the site was found to be underlain predominantly by thick layers of clay and silt with lesser accumulations of sand, sandy silt, silty sand and clayey sand to a maximum drilling depth of 41.5 feet.

6.0 ADSORBED-PHASE HYDROCARBONS IN SOIL

Assessment and sampling investigations have been conducted at the site from 1996 through the present. To better evaluate the extent of hydrocarbons in the subsurface, GSC prepared site plans (Figures 4, 5 and 6) showing the residual contaminant soil concentrations at the site for depth intervals of 10 to 20, 20 to 25 and 25 to 30 feet bgs, respectively. The soil analytical data suggests that residual soil contamination beneath the site is significant and extends from the ground surface into the water table to at least a depth of 30 feet bgs. Soil contamination beneath the site appears to include dissolved phase contamination as some soil samples containing detectable petroleum hydrocarbons were taken below the depth of first-encountered

groundwater, thus it is likely that hydrocarbons are "trapped" below groundwater and will be a continual source of dissolved hydrocarbons in groundwater unless abated to the extent feasible.

Based on the sampling data from the borings and the site plans showing the residual contaminant soil concentrations, the contamination appears to be concentrated in the central to northern portion of the site, as the two borings at the southern edge of the site contained no petroleum hydrocarbons in soil to the maximum drilling depth. Historical soil sample analytical results are presented in Table 2. The highest hydrocarbon concentrations were found in borings MW-1 and MW-3 located northeast and west of the USTs and pump islands respectively. MW-1 showed a hydrocarbon concentration of 2,790 milligram per kilogram (mg/kg) at a depth of 30.5 feet bgs and MW-3 showed a hydrocarbon concentration of 1,600 mg/kg at 35.5 feet bgs (Figure 6). Thus, these areas will be the primary focus of the hydrocarbon mass removal and remedial efforts.

Using the isoconcentration maps presented in Appendix C (Figures 1A, 2A and 3A), assumed soil densities from the drill logs, and average TPHg concentrations for subsections of the site, GSC estimates that the upper 30 feet of soil beneath the site contains a mass of approximately 2,400 pounds (lbs) of TPHg. Approximately 26,500 cubic feet (ft^3) of soil contain detectable levels of TPHg. Approximately 16,000 ft^3 of soil around the center pump island and western side of the USTs contain soil with TPHg concentrations greater than 100 mg/kg. Maps used to determine the volume of soil contamination and volumetric calculations are provided in Appendix C.

7.0 DISSOLVED-PHASE HYDROCARBONS IN GROUNDWATER

The most recent groundwater monitoring and sampling event was performed on April 21, 2004 (see Appendix B). Eight monitoring wells were monitored (MW-1 through 8), however MW-1 was classified as dry when a water sample could not be obtained. Dissolved-phase TPHg concentrations in the wells ranged from non-detect (well MW-2) to 27,000 µg/L (in well MW-3 located northwest of USTs). Benzene concentrations in the wells ranged from non-detect (MW-4) to 840 µg/L (MW-3). Dissolved-phase MTBE ranged from non-detect (MW-2, MW-3 and, MW-6) to 41 µg/L (MW-5). Based on the April 2004 sampling episode, the groundwater plume appears to be concentrated beneath the central to northwest portion of the site. Historical groundwater sample analytical results are included in Appendix B.
The groundwater gradient was consistent with the historic gradient at the site, toward the west at 0.01 foot/foot. The gauging and analytical data and groundwater contour map with annotated hydrocarbon concentrations from second quarter 2004 are included in Appendix B.

8.0 EVALUATION OF REMEDIATION ALTERNATIVES

Preliminary selection of the remedial alternatives was performed in conjunction with both the long-term operational goals for the site and the general applicability of each alternative. Thus, GSC considered the various selection criteria to determine the most feasible technology(ies) for remediation of soil and groundwater the site. A discussion of the feasibility of the remedial technology alternatives was prepared to evaluate various treatment technologies on the basis of the following: media treated; time/duration; geology/hydrogeology; site logistics; cost and effectiveness. The results of the discussion are summarized in Table 3. This evaluation identified high-vacuum dual phase extraction for source removal as the most feasible treatment method for this site. Further details are provided in the following section for planned remedial action at the site.

8.1 EXTENT OF CONTAMINATION

Two cross-sections that were prepared for the site by NMWW, Inc. are included in Appendix D. The cross sections illustrate that soil in the vadose zone consists predominantly of silt and clay with minor lenses of sand. Soil contamination was found above a depth of about 25 feet bgs in soil borings completed around the western periphery of the USTs and the center pump island. Soil contamination beneath the site is also associated with dissolved phase contamination as some of the soil samples containing detectable petroleum hydrocarbons were below the depth of first-encountered groundwater.

Based on historical groundwater analytical data, it appears that the majority of groundwater impact is concentrated beneath the central to northwestern portion of the site with occasional and minor impact in the southeast corner of the site.

8.2 FEASIBILITY STUDY

Potential alternatives for soil and groundwater remediation were identified and screened against the remediation objectives for the site, i.e., cost-effective site closure. The following seven remediation alternatives were screened:

1. Groundwater extraction and treatment,
2. SVE,
3. Air sparging,
4. Excavation,
5. Enhanced bioremediation,
6. Natural attenuation, and
7. No action.

Table 3 presents a summary of these seven remediation technology alternatives. Each is discussed in detail below.

1. **Groundwater Extraction:** A groundwater extraction system would recover dissolved-phase petroleum hydrocarbons from the groundwater and, if placed correctly, should recover any separate-phase hydrocarbons, if present. The system would also prevent migration of impacted groundwater off site and recover impacted groundwater that has migrated off site. In addition, groundwater extraction results in lowering the water table to expose previously saturated-zone soils to other remedial technologies (such as SVE). Recovered groundwater could be treated using a variety of methods, including air stripping, activated carbon or direct treatment at a publicly owned treatment facility. The low permeability that is associated with fine-grained soils such as clay potentially poses a problem, as it may be difficult to extract groundwater from those sediments. However, from the site assessment report (2001), it was noted by NMWW that the clay appeared to be fractured and permeable lenses of sand were interlayered with the finer sediments; in addition, GWM&S events have shown relatively fast recharge of groundwater wells when bailed (see Appendix B). The operating costs of a groundwater extraction system are moderately high. *Groundwater extraction is a feasible technology and is retained for further screening.*

2. **Soil Vapor Extraction:** An SVE system could be used to remove volatile organic compounds (VOCs) from the capillary fringe zone (with groundwater depression) and encourage biodegradation of petroleum compounds in soil. Based on the soil characteristics

(predominantly silts and clays), a small radius of influence (ROI) and low airflow rate are expected for this site. Therefore, a relatively large blower capable of applying high vacuum would be required. The installation and operation of an SVE system would have a minimal effect on site operation, compared to the excavation alternative. *SVE is retained for further screening and evaluation.*

3. **Air Sparging:** This technology involves the injection of air into the groundwater, stripping volatile petroleum compounds from the groundwater and releasing them as vapors into the vadose zone. Once in the vadose zone, the hydrocarbon-charged vapors are removed through SVE. Air sparging also increases the dissolved oxygen in the impacted groundwater, increasing the oxygen available for aerobic bioremediation of petroleum hydrocarbons. Success of air sparging has been demonstrated at sites with relatively permeable saturated-zone soils (sands). At sites with less permeable soils (clays and silts), air sparging has not been effective. In addition, where tight soils exist, there is a risk of not capturing all of the stripped volatiles from the vadose zone. *Air sparging is retained for further screening to compare with other methods.*

4. **Excavation:** Excavation of petroleum-impacted soil and backfilling with clean material would require removal of large amounts of soil from the property and would severely impact station operations. It could also result in potential air emissions of VOCs. Impacted capillary fringe soil may also be present off site (downgradient) where it cannot be excavated. Excavation of impacted soil along the property boundary would require extensive shoring. *Due to difficulty and cost of implementation, excavation is not retained for further screening.*

5. **Enhanced Bioremediation:** Enhanced bioremediation utilizes the injection of hydrocarbon-degrading bacteria (including MTBE degrading bacteria) and nutrients into the subsurface. Typically, rows of low-flow biosparge wells are used to provide oxygen to the subsurface. This technology requires extensive and careful maintenance to insure proper balance of the injected nutrients and bacteria. *Enhanced bioremediation is retained for further screening.*

6. **Natural Attenuation:** Natural attenuation is a naturally occurring process which results in reducing dissolved contaminant concentrations primarily by biodegradation and physical loss mechanisms, such as sorption, dilution, and dispersion. Natural attenuation with bioremediation can occur in any environment that supports microbiological activity. The rate of biodegradation is site-specific and may be limited due to the lack of oxygen or inorganic nutrients, such as fixed nitrogen, an extreme pH, or limited contaminant bioavailability. *Natural attenuation is a cost-effective alternative, however, due to the relatively low permeability soils and the proximity of the dissolved plume to the western edge of the property, this alternative is not retained.*

7. **No Action:** A "no-action" alternative would involve continued periodic sampling of soils, soil vapors, and groundwater. The potential off-site migration of groundwater would not be controlled. *Implementation of the no-action alternative would not meet the remediation goals and therefore is not retained.*

8.3 EVALUATION MATRIX FOR RETAINED REMEDIATION

Each of the retained remedial alternatives was further evaluated. Where appropriate, a combination of two remedial alternatives was evaluated. The most feasible remedial alternatives are as follows:

1. Dual-phase extraction (GWET and SVE),
2. Air sparge and SVE, and
3. Enhanced bioremediation.

These feasible remedial alternatives have been further evaluated based on the following criteria:

- Level of protection of human health and the environment,
- Reduction of hydrocarbons,
- Implementation and operation,
- Cost effectiveness,
- Compliance with regulatory guidelines,
- Short-term effectiveness,
- Long-term effectiveness, and
- Community acceptance.

A detailed evaluation matrix is provided in Table 4. Given the site's subsurface conditions and considering all of the evaluation criteria, dual-phase extraction is the best alternative for this site when compared to the other two feasible alternatives. Dual-phase extraction will accomplish the following objectives:

- Reduce dissolved hydrocarbon concentrations in groundwater;
- Prevent potential migration of hydrocarbons off site to the west of the property;
- Recover any hydrocarbons that may have migrated to the property immediately east of the site;
- Reduce residual hydrocarbons within the capillary fringe and saturated-zone soils;
- Protect human health and the environment; and,
- Obtain clean closure at the site.

Dual phase extraction can be installed as two independent technologies, SVE and GWET, where the groundwater and vapors are extracted separately using a combination of groundwater extraction pumps and a vacuum blower or as one technology where extraction wells extend below the water table and a high vacuum is applied through the extraction wells to simultaneously remove groundwater and vapors from the subsurface. Once above ground, the extracted vapors and groundwater are separated and treated. In the latter technology, referred to as high-vacuum dual phase extraction (HVDPE) the vacuum applied to the subsurface with dual phase extraction systems creates vapor-phase pressure gradients toward the vacuum well, which cause both the subsurface liquid and soil vapors present to flow toward the vacuum well in response to the imposed gradients. The higher the applied vacuum, the larger the hydraulic gradients that can be achieved in both vapor and liquid phases, and thus the greater the vapor and liquid recovery rates. SVE and GWET systems are generally best used at sites with loose soil, whereas HVDPE is generally better suited at sites with dense, clayey soil because of the high vacuum. The complexity of the site raises questions as to which dual phase extraction system should be implemented to best remove contamination. The presence of clay beneath the site indicates that HVDPE is the best remediation technology to meet the goals of the project, however the question as to whether or not there is significant transmissivity in one or more of the strata is based on the relatively fast recharge in one or more of the wells

(Appendix B), which is uncharacteristic of tight soils. Therefore in order to confirm which dual phase method will be most appropriate for the site, HVDPE pilot testing will initially be completed. Additional tests for SVE and GWET will be performed if HVDPE testing shows that HVDPE must be combined with other technologies to effectively complete site remediation. To properly implement the selected remedial technology, field pilot tests will be conducted in the vicinity of MW-3 and MW-5 using both existing wells and HVDPE wells. This will be the most logical location for the tests because it is the area with the highest contaminant concentration. It appears that HVDPE will be the most viable remedial option, and pilot testing should confirm that. However, combination of HVDPE and SVE/GWET may be used to remediate the site.

9.0 REMEDIAL ACTION BY DUAL PHASE EXTRACTION

9.1 FEASIBILITY OF IMPLEMENTATION

Based on the type of contaminant (light-end, volatile hydrocarbons - gasoline), depth and lateral extent of hydrocarbon-bearing soil, elevated dissolved-phase hydrocarbon concentrations, current site usage, in situ HVDPE (possibly in combination with SVE/GWET) is a technically sound, time- and cost-effective approach to remediation at this site.

Although aquifer and/or HVDPE testing has not been completed at the site, the lithology in the saturated zone is predominantly low permeability fractured clay or interlayered clay and clayey sand which indicates that the hydrogeology will be suitable for HVDPE implementation with possible enhancement using SVE and GWET. HVDPE will effectively extract hydrocarbon-laden groundwater, control migration of dissolved-phase hydrocarbons, lower the water table to expose submerged hydrocarbon-bearing soil, and volatilize hydrocarbons (including MTBE) from the subsurface.

Pilot testing will be needed to properly design the remediation system. The test will confirm aquifer characteristics, capture radii, and engineering design parameters for the remediation system. Radii of influence in the vadose and saturated media will be confirmed at the time of testing. Details of additional wells needed for pilot tests, test procedures, and remediation implementation procedures are provided in the following sections.

9.2 DRILLING AND SOIL SAMPLING

Two 4-inch diameter HVDPE remediation wells (GSC-HV-1P and GSC-HV-2P) will be installed on site. Figure 7 shows the proposed locations of the wells. Both wells will be located on the western side of the USTs, one well will be south of the station building, and the second located in front of the station building entrance. Drilling will be completed using CME-75 or equivalent hollow-stem auger drill rig. Soil samples for potential chemical analyses, field screening, and logging purposes will be collected at 5-foot depth intervals to total depth using a split-spoon sampler containing brass sleeves for sample retention. Soil samples for potential chemical analysis will be immediately sealed with Teflon™ film, capped, and taped to avoid possible loss of volatile hydrocarbons. The sample sleeves will be labeled and placed in a chilled cooler for delivery to a State-certified analytical laboratory. Remaining soil will be visually classified in accordance with the Unified Soil Classification System. In addition, soils will be monitored for volatile organic vapors by the headspace method using a hand-held photoionization detector (PID).

All sampling equipment will be cleaned in an aqueous solution of non-phosphate detergent, rinsed with tap water, and rinsed a second time with deionized water to prevent cross-contamination between borings and sample intervals. Soil cuttings will be placed in properly labeled DOT-approved, 55-gallon drums for temporary on-site storage. Decontamination and well development water will also be placed in 55-gallon drums and temporarily stored on site pending disposal/recycling. All waste will be properly disposed in accordance with all applicable Federal, State, and local regulations.

Upon completion of the drilling and soil sampling, wells will be installed in the boreholes as detailed in Section 9.3, below. All drilling will be completed by an experienced field geologist working under the supervision of a California Registered Geologist.

9.3 HVDPE Well Installation

All existing groundwater monitoring wells at the site are currently constructed with 2-inch diameter PVC casing. Due to the required down-hole stinger pipe for HVDPE, larger diameter wells are required to accommodate HVDPE with less friction and vacuum loss. It is anticipated that 4-inch diameter wells will be installed. The wells can be used for conducting both HVDPE and SVE pilot tests. Wells GSC-HV-1P and GSC-HV-2P will be installed as 35-foot, 4-inch diameter wells for use as test/observation wells during feasibility testing for system design, and for subsequent soil and groundwater remediation. Schedule 40 PVC casing will be used for the well construction. Screened intervals (0.01-inch slots) will extend from approximately 10 to 35 feet below ground surface (bgs), and the annular space will be packed with #2/12 Monterey sand from total depth to approximately 2 feet above the screened intervals. Stingers will be set at various depths to target contaminated zones for remediation. Groundwater at the site is expected to be approximately 21 to 27 feet bgs.

During installation and prior to setting the annular seal, surging and bailing will be completed for well development to settle any void spaces in the sand pack and remove fines from the water column. At least two feet of hydrated bentonite chips will cap the sand pack and cement/bentonite grout will extend to approximately one foot bgs. Concrete will then be placed above the annular seal for installation of well boxes. A summary of well installation activities will be included in the subsequent Pilot Test Report (see Section 9.6, below).

9.4 Soil Analysis

Selected soil samples will be submitted to a State-certified laboratory for analysis of TPHg, BTEX, and MTBE using EPA Method 8260.

9.5 Ongoing Groundwater Sampling

World's sampling contractor will continue to perform quarterly groundwater monitoring and sampling (GWM&S) on currently existing groundwater monitoring wells during the design and pre-construction phase of the project. Upon installation of the remediation system, quarterly GWM&S protocol will be altered as necessary and combined with system operations and maintenance (O&M). Groundwater monitoring wells will be sampled quarterly for laboratory analysis of the contaminants of concern to confirm baseline concentrations before HVDPE remediation. Once remediation begins at the site, both monitoring wells and extraction wells (i.e., influent water to the remediation system) will be sampled to evaluate the progress of the remediation. Treated (effluent) water will also be sampled and analyzed quarterly to confirm system efficiency and compliance. GSC will continue to prepare quarterly Groundwater Monitoring and Status Reports for the site until remediation is implemented. Upon system

implementation, combined quarterly GWM&S/O&M Status Reports will be prepared (see Section 9.12, below).

9.6 HVDPE CONFIRMATION PILOT TESTING AND REPORTING

To properly design the HVDPE system, aquifer parameters, capture radii for both vapor and groundwater, and other engineering design parameters for the full-scale remediation system will be obtained by completing a HVDPE pilot test. The selected test well (likely well GSC-HV-1P) will be retrofitted with a rubber grommet and a PVC or flexible high vacuum stinger pipe (angle cut at bottom) for use as the primary extraction point. Additional extraction points may be utilized based upon encountered test conditions and allowable test duration.

The test will be conducted using a specially equipped pilot test unit. This unit will include a liquid-ring pump capable of sustaining a vacuum of 28 inches of Hg, and a separator/knockout tank equipped with high/low water level switches. The unit will be fitted with vapor conveyance piping to route effluent vapors to either carbon vessels, an internal combustion (I.C.) engine, or a thermal oxidizer provided for treatment and properly permitted with Bay Area Air Quality Management District (BAAQMD) for the test. Extracted water/product will be transferred from the knockout tank with a transfer pump to standby drums and/or a poly-tank. Extracted fluids will be properly transported under non-hazardous manifest for recycling at a licensed facility.

Water levels in the monitoring wells during testing will be monitored to the nearest +/- 0.01 foot with a water level meter. A data logger with pressure transducers may be utilized to record drawdown/recovery in the monitoring (observation) wells; however, applied vacuums affect the pressure readings on submersible transducers. Thus, water levels in the wells within the area of induced vacuum (near the extraction well) may be incorrect. In the region outside the area of induced vacuum, water level changes caused by extraction of groundwater can effectively be measured with a real time data logger/transducer system. Differential pressure gauges will be used to monitor induced vacuums at the test wells and observation points. To prevent vacuum loss/short-circuiting, vacuum readings will be obtained at the beginning of the test prior to removing any well caps for water level measurements. Tedlar bags will be utilized to monitor advective airflow in the wells, as well as vacuum.

Throughout the test, a laptop computer will be utilized to monitor/control data logger operations and to calculate adjusted water levels.

Field measurements will likely include, but not be limited to the following parameters:

- Induced vacuum pressure;
- Advective air flow;
- Vapor extraction flow rate;
- Groundwater flow rate and surging frequency;
- CO_2 and O_2 concentrations in extracted air;
- Temperatures of extracted vapor streams;
- Depth to groundwater (pre-test), during testing (drawdown), and during recovery; and
- Hydrocarbon concentrations in extracted vapor stream.

Groundwater and Tedlar bag vapor samples will be obtained at the beginning, middle, and end of the testing for laboratory analysis by a State-certified laboratory for analysis of TPHg/BTEX/MtBE by EPA Method 8260.

Upon completion of the HVDPE testing, a report will be prepared which summarizes the methodologies and findings. Details of the well installations and associated findings will also be included. Depending on results from the design test, the approach may be modified for dual-phase vapor/water extraction and further pilot testing may be recommended prior to remediation system design. Specifically, if the necessary hydraulic control cannot be achieved with high vacuum fluid extraction through stingers in the wells, then wellhead vapor extraction, coupled with conventional groundwater pumping, may be implemented.

9.8 HVDPE System Installation

The proposed HVDPE system will utilize a network of vertical wells and lateral subsurface conveyance piping manifolded to a thermal/catalytic oxidizer for vapor treatment, and liquid-phase carbon for groundwater treatment. A maximum vapor flow capacity of approximately 250 scfm, a maximum liquid flow of 30 gpm, and a maximum vacuum of approximately 220 inches of water is anticipated.

Specifications for the proposed HVDPE system will be as follows:

- Fenced treatment compound on the western border of the site behind the station building;
- Proposed HVDPE remediation well network consisting of new and previously installed on-site monitoring/remediation wells;
- Dedicated extraction stinger pipe (1-inch to 2-inch diameter) in each connected well that extends into groundwater;
- Subsurface PVC fluids conveyance piping with sweep elbows (2-inch to 4-inch diameter PVC);
- 4-inch diameter PVC storm water discharge line or discharge line to the on-site sanitary sewer (pending further cost feasibility evaluation);
- Liquid-ring pump or blower package capable of sustaining vacuum of 200 inches of water;
- High-vacuum, knock-out tank with a de-mister pad and transfer pump;
- Separation/settling tank;
- Bag filters;
- Calibrated flow meter;
- Potential anti-scale chemical injection system (if scale forms in lines and carbon);
- 200 to 250 scfm thermal/catalytic oxidizer;
- Two 1,000-lb. or 2,000-lb. liquid-phase carbon vessels; and
- 1-inch make-up water line for liquid-ring pump operation (if liquid-ring pump is used).

Engineering design plans, including a site plan showing remediation well and remediation piping configurations, a process & instrumentation diagram, an electrical one-line diagram, a plan showing the proposed remediation equipment configuration, and detail drawings will be prepared upon completion of pilot testing.

9.9 Piping and Well Box Layout and Installation

A 2- to 3-foot diameter, traffic-rated well box will be installed at each of the monitoring/ remediation well locations. The well boxes will be installed flush with or slightly above the new surface grade during resurfacing of the site with concrete. The boxes will be bolted to prevent unauthorized access to the wells and will be of sufficient diameter and depth to accommodate the wellhead manifolding for stinger installation in the well, and valves and fittings.

A dedicated Schedule 40 PVC pipe (2- to 4-inch diameter) will be installed to each well from a central manifold location behind the station building. The pipes will be connected to the wells and pipes will be installed in a common piping trench (where possible) at a depth of approximately 2 feet bgs. The piping will be multi-functional and can be used for conveying vapors and/or liquid, or for pulling hoses through the pipe for pumping fluids with pneumatic pumps in selected wells (if later deemed necessary). "Sweep" piping elbows will be used where possible to allow for potential installation of hoses through selected PVC pipes at a later date.

During excavation and trenching, air monitoring will be completed in accordance with applicable BAAQMD regulations. Soil will be segregated and stockpiled for characterization for on-site re-use or off-site transport for thermal recycling.

9.10 PERMITTING AND UTILITY SERVICES

An NPDES permit application will be completed and submitted with fees to the SFRWQCB for approval. If sewer discharge is deemed more feasible based on involved fees, catch basin location, and tie-in costs, permitting will be completed with San Pablo Sanitary District (SPSD) instead of NPDES permitting.

The selected vapor treatment unit will be permitted with BAAQMD with an Authority-to-Construct/Permit to Operate. Air monitoring during excavations and trenching will also be completed per BAAQMD requirements.

Engineering plans for the HVDPE system will be approved by the City of San Pablo Building and Safety Department. Approvals will likely include electrical permit and inspection, mechanical, and plumbing. Additionally, necessary approvals will be obtained from the City of San Pablo Fire Department. All necessary approvals will be obtained before the installation, and all final inspections will be completed in conjunction with the final installation.

Applications will be submitted for utility services, including telephone, natural gas, and electricity.

A summary of permitting contacts for the site work is provided below.

Activity	**Agency**	**Contact Information**	
		Phone Number	Comments
Air Monitoring	Bay Area Air Quality Management District (BAAQMD)	(415) 749-5000	Administrative Offices located in San Francisco
Electrical Plan Check & Inspection	City of San Pablo Building and Safety	(510) 215-3060	
Mechanical Plan Check	City of San Pablo Building and Safety	(510) 215-3060	
Plumbing Plan Check	City of San Pablo Building and Safety	(510) 215-3060	

Planning Department Approvals	City of San Pablo Planning Division	(510) 215-3030	
Vapor Abatement Equipment Approvals	Bay Area Air Quality Management District (BAAQMD)	(415) 749-5000	Administrative Offices located in San Francisco
Fire Department Approvals	San Pablo Fire Department	(510) 374-7070	Branch Office
Well Permitting	City of San Pablo Planning Division	(510) 215-3030	

9.11 START-UP, OPERATION AND MAINTENANCE (O & M), AND MONITORING

Start-up and O&M will be performed in accordance with Contra Costa Health Services (CCHS), BAAQMD, SFRWQCB, and NPDES (or SPSD) requirements. Pre-discharge effluent sampling will be collected and analyzed in accordance with permit conditions. It is anticipated that three site visits will be completed during the first week (start-up period). Thereafter, at a minimum, weekly O&M of the HVDPE system will be performed at the site. These weekly site visits will include monitoring of influent and effluent VOC concentrations, air flows (scfm), liquid flows, manifold vacuums (inches of water), operating temperatures, electricity and natural gas usage, and valve positioning.

Vapor samples will be collected monthly (or per permit requirements) to confirm weekly field PID/FID readings. Samples will be analyzed by a State-certified laboratory for TPHg/BTEX/MTBE by EPA Method 8260. Analytical results will be used in hydrocarbon destruction calculations.

Effluent water samples will be collected on a monthly basis (or per permit requirements), and analyses will be completed in accordance with the NPDES permit. Intermediate samples (between the carbon vessels) will also be collected and analyzed periodically to monitor for carbon break-through in the first vessel. When breakthrough has occurred, GSC will coordinate carbon change out with World's carbon contractor, and re-route the piping to the vessels. The secondary vessel will be placed first in line and the new carbon will be placed as the secondary vessel.

In addition to general "housekeeping," system maintenance will be conducted to clean equipment, change fluids, and lubricate valves and machinery per manufacturer specifications. Stinger depth and configuration will also be adjusted (as necessary) to optimize the remedial efforts.

9.12 REPORTING AND PROGRESS TOWARD CLOSURE

Remedial progress reporting will be completed in accordance with all permit requirements and conditions specified by the CCHS and/or SFRWQCB. Generally, this requires quarterly report submittal (operations, status, and NPDES reports) to the CCEH, SFRWQCB, and BAAQMD by the last day of the month following the end of each calendar quarter. Quarterly combined GWM&S/O&M Status Reports will include tabulated monitoring results, graphical representation of hydrocarbons removed, and laboratory reports and Chains-of-Custody. The initial Quarterly combined GWM&S/O&M Status Report will contain details about the system start-up. Information will be presented regarding the HVDPE system status and operation, monitoring records, and progress evaluation. Also, progress toward closure will be reported

along with any changes, modification, or other significant information that may affect the operation of the HVDPE system.

When petroleum hydrocarbons concentrations in the extracted vapor stream become asymptotic (graphically), or they are consistently below the maximum established regulatory levels, and dissolved-phase hydrocarbon levels have decreased to below acceptable regulatory levels or show a continual decreasing trend, a letter workplan will be submitted recommending low-risk closure evaluation and/or closure borings. If needed, up to four borings will be proposed in the areas currently showing the highest hydrocarbon concentrations. Borings will be drilled and sampled to the maximum depth of the originally-defined zone of contamination. A minimum of one soil sample per five vertical feet of soil boring will be chemically analyzed. If laboratory analytical results from the closure borings indicate that adsorbed-phase petroleum hydrocarbon concentrations have been adequately remediated, site closure or conditional site closure (soil only) will be requested. Continued long-term passive remediation would then provide adequate protection to the environment and human health to no longer necessitate active remediation.

10.0 PROJECT SCHEDULE

Well Installation
Assuming approval of this RAP is obtained from the SFRWQCB before June 1, 2005, remediation test well installation is anticipated to begin as early as June 2005. Two weeks will be required for scheduling and notifications for the involved parties and well permitting. Field work (well installation and HVDPE testing) will require approximately two to three weeks to complete, depending on the encountered field conditions and agency approvals. Soil, vapor and groundwater analytical results should be received from the laboratory within two weeks of the fieldwork.

Design/Permitting
Approximately two months following HVDPE pilot/design testing and agency approvals to proceed, engineering design of the HVDPES will be completed. Permit applications and fees will be submitted to the appropriate agencies with the engineering drawings. Final agency plan checks and approvals to the design will require up to two months following submittal of fees and plans. NPDES or sanitary sewer discharge permitting can be completed concurrent with local agency permitting and be completed approximately two months after completion of the design.

HVDPES Installation/Start-up
Following finalization of the design and concurrent with agency permitting, the installation will be bid out to at least three qualified construction contractors. Contractor selection will require approximately two weeks following issuance of the bid. Following receipt of all necessary permits, field work and field inspections for the installation will require approximately three weeks. Start-up of the HVDPES will be completed within one week after final utility connections and agency inspections/notifications. Operation and maintenance and periodic reporting will be completed thereafter throughout the remedial process.

11.0 STANDARD LIMITATIONS

This Feasibility Study and remedial Action Plan has been prepared as a guidance document for a planned remediation program. Situations may arise which may require modifications to the scope of work. Should any modifications be necessary, the changes will be documented in the field records. If actual field

conditions result in deviation from this FS/RAP, the SFRWQCB will be notified. The exact duration of the remediation activities is unknown and is dependent upon actual subsurface conditions at the site.

All work will be performed under the supervision of a registered geologist as defined in the Registered Geologist Act of the California Code of Regulations. The information contained in this report represents our professional opinions, and is based in part on information supplied by the client. These opinions are based on currently available information and are arrived at in accordance with currently accepted hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied or intended.

12.0 REFERENCES

CRWQCB, 2004. California Regional Water Quality Control Board, *Beneficial Use-Protective Water Quality Limits for Components of Petroleum-Based Fuels.* April 1.

CRWQCB, 2003. California Regional Water Quality Control Board. *Maximum Contaminant Levels and Regulation Dates for Drinking Water Contaminants: USEPA vs. CDHS.* September 12.

GSC, 2004. *Second Quarter 2004 Groundwater Monitoring and Sampling Report*, World Oil Marketing Company Station No. 24, 13013 San Pablo Avenue, San Pablo, California. July 12.

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NMWW, 2002. NMWW, Inc. *Baseline Human Health Risk Assessment*, World Oil Station No. 24, 13013 San Pablo Avenue, San Pablo, California. RWQCB File No. 07-0756 (BGS). May 22.

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TABLES

TABLE 1
COST COMPARISON
GWM&S VS. HVDPE REMEDIATION SYSTEM
World Oil Station 24
13013 San Pablo Avenue
San Pablo, California

Quarterly Groundwater Monitoring and Sampling		
Task	**Cost Per Quarter**	**Cost Per Year**
GWM&S[1], 8 wells, 1 day, 1 day traffic control	$2,210.00	$8,840.00
GWM&S Laboratory Analysis	$440.00	$1,760.00
GWM&S Reporting	$1,250.00	$5,000.00
Purged water disposal	$600.00	$2,400.00
Total Estimated Cost	**$4,500.00**	**$18,000.00**

Site Remediation			
Task	**One-Time Cost**	**Cost Per Year**	**Total Cost[3]**
Consulting Labor, Design and Installation-System Design and Engineering of HVDPE[2]	$5,000.00		$5,000.00
Permits-Wastewater, Air and Construction	$5,000.00		$5,000.00
Contractor Cost for Installation-Equipment and Labor	$80,000.00		$80,000.00
O&M[4], Reporting, Utility Bills, Laboratory Costs and Miscellaneous Repairs		$47,605.00	$95,210.00
Quarterly GWM&S.		$18,000.00	$36,000.00
Total Estimated Cost			**$221,210.00**

HVDPE Remediation Installation, Operation and Maintenance toward site closure is equivalent to approximately 12 years of quarterly GWM&S.

[1]GWM&S = groundwater monitoring and sampling.
[2]HVDPE = high-vacuum dual phase extraction.
[3]Total cost is for two years of system operation and GWM&S.
[4]O&M = operations and maintenance.
All costs are estimated.

TABLE 2
HISTORICAL SOIL SAMPLE ANALYTICAL RESULTS
World Oil Station 24
13013 San Pablo Avenue
San Pablo, California

Sample ID with Depth	Sample Date	TPHg (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	MTBE (mg/kg)	Total Lead (mg/kg)
Samples from Soil Borings Completed in August 1996								
B-1-5	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-1-10	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-1-15	08/26/96	0.073	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-1-20	08/26/96	38	0.11	0.53	0.25	4.2	0.45	--
B-2-5	08/26/96	0.073	ND<0.003	ND<0.003	ND<0.003	0.0065	ND<0.003	--
B-2-10	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-2-15	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-2-20	08/26/96	0.14	0.0055	ND<0.003	ND<0.003	0.078	ND<0.003	--
B-3-5	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-3-10	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	0.42	--
B-3-15	08/26/96	1.3	0.16	ND<0.003	0.13	0.60	1.6	--
B-3-20	08/26/96	2.5	0.18	0.13	0.058	0.060	2.0	--
B-4-5	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-4-10	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-4-15	08/26/96	0.23	0.018	0.037	0.0033	0.017	0.0076	--
B-4-20	08/26/96	4.0	0.12	0.63	0.053	0.24	0.13	--
B-5-5	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-5-10	08/26/96	0.31	0.16	ND<0.003	ND<0.003	0.035	0.12	--
B-5-15	08/26/96	0.63	0.026	ND<0.003	ND<0.003	0.0067	0.18	--
B-5-20	08/26/96	1.0	ND<0.003	ND<0.003	ND<0.003	0.059	0.058	--
B-6-5	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-6-10	08/26/96	--	--	--	--	--	--	--
B-6-15	08/26/96	0.067	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-6-20	08/26/96	0.63	0.015	0.0042	ND<0.003	0.078	0.032	--
B-7-5	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-7-10	08/26/96	3.0	ND<0.003	ND<0.003	ND<0.003	0.24	0.0091	--
B-7-15	08/26/96	5.7	0.022	ND<0.003	0.23	0.50	0.056	--
B-7-20	08/26/96	220.0	ND<0.003	0.60	0.19	7.1	ND<0.003	--
B-8-5	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-8-10	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-8-15	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-8-20	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-9-5	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-9-10	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-9-15	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-9-20	08/26/96	3.3	ND<0.003	0.14	0.18	0.32	ND<0.003	--
B-10-5	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	0.0047	--
B-10-10	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-10-15	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--
B-10-20	08/26/96	ND<0.05	ND<0.003	ND<0.003	ND<0.003	ND<0.003	ND<0.003	--

TABLE 2
HISTORICAL SOIL SAMPLE ANALYTICAL RESULTS
World Oil Station 24
13013 San Pablo Avenue
San Pablo, California

Sample ID with Depth	Sample Date	TPHg (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	MTBE (mg/kg)	Total Lead (mg/kg)
Samples from Excavation Completed in October-November 1997								
UST Pit Samples								
T1-1	10/08/97	ND<1.0	0.10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	8.8
T1-2	10/08/97	9,400	6.6	260	140	1,100	ND<20	21
T2-1	10/21/97	900	0.47	4.2	8.3	110	11.00	14.0
T2-2	10/21/97	58	0.12	1.9	0.81	5.1	13	9.4
T3-1	10/21/97	2,800	3.2	52	88	610	ND<10	14
T3-2	10/21/97	810	0.35	11	13	110	6.7	9.3
T4-1	10/21/97	56	0.037	0.095	0.65	2.5	ND<0.2	6.4
T4-2	10/21/97	1,700	0.94	1.3	43	53	ND<2.0	12.0
Fuel Island Samples								
F1-1	10/15/97	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005	NA
F1-2	10/15/97	1500	ND<0.20	13	23	180	ND<2.0	NA
F1-3	10/15/97	ND<1.0	ND<0.005	ND<0.005	0.015	ND<0.005	ND<0.005	NA
Overexcavation Samples								
CS-1	11/12/97	8,000	0.6	26	140	710	ND<0.05	12
CS-2	11/12/97	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	0.026	6.5
CS-3	11/12/97	0.16	ND<0.005	ND<0.005	ND<0.005	0.0059	0.93	10
CS-4	11/12/97	2.4	0.0037	0.012	0.022	0.2	7.5	8.2
Samples from Soil Borings Completed in April 1999								
B-11-19.5'	04/12/99	ND<0.400	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.010	8.27
MW-1-10.5'	04/12/99	ND<0.400	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.010	5.87
MW-1-18.5'	04/12/99	ND<0.400	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.010	4.76
MW-1-25.5'	04/12/99	0.54	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.010	5.12
MW-1-30.5'	04/12/99	2,790	ND<1	ND<1	6.94	5.90	ND<5	4.79
MW-2-5.5'	04/12/99	ND<0.400	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.010	4.99
MW-2-15.5'	04/12/99	ND<0.400	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.010	5.13
MW-2-23'	04/12/99	ND<0.400	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.010	5.70
MW-2-30.5'	04/12/99	ND<0.400	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.010	5.68
MW-3-5.5'	04/12/99	ND<0.400	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.010	5.44
Samples from UST Removal Completed in September 2002								
MW7-11.5	09/04/02	ND<0.5	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.005	--
MW7-21.5	09/04/02	ND<0.5	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.005	--
MW7-31.5	09/04/02	ND<0.5	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.005	--
MW7-41.5	09/04/02	ND<0.5	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.005	--
MW8-11.5	09/04/02	ND<0.5	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.005	--
MW8-21.5	09/04/02	ND<0.5	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.005	--
MW8-31.5	09/04/02	ND<0.5	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.005	--
MW8-41.0	09/04/02	ND<0.5	ND<0.002	ND<0.002	ND<0.002	ND<0.004	ND<0.005	--

Notes:

mg/kg = milligrams per kilogram.

TPHg = Total petroleum hydrocarbons as gasoline (EPA Method 8015M).

BTEX = Benzene, toluene, ethylbenzene and total xylenes (EPA Method 8020M, 8260B).

MTBE = Methyl tertiary-butyl ether (EPA Method 8020M, 8260B).

Total Lead (EPA Method 6020).

ND = Not detected above the laboratory reporting limit.

NA = Not analyzed

-- = Not Sampled

TABLE 3
REMEDIAL TECHNOLOGY ALTERNATIVES
World Oil Station 24
13013 San Pablo Avenue
San Pablo, California

	Technology	Retained	Comment
1.	Groundwater Extraction and Treatment	Yes	Reduces mass, well understood. Moderately easy to implement. Hydrocarbon-impacted groundwater is removed and treated ex-situ. Effective migration control and removal of dissolved constituents.
2.	Soil Vapor Extraction; Soil Vapor Extraction and Groundwater Extraction (Dual Phase Extraction); Or High-Vacuum Dual Phase Extraction (HVDPE)	Yes	Effective at reducing mass in the vadose zone, capillary fringe, and soils below the water table when the water table is lowered by groundwater extraction. Minimally effective at reducing mass dissolved in groundwater when used exclusively. Moderate capital costs.
3.	Air Sparging	Yes	Requires relatively permeable (sandy) and homogenous soils to be effective. Requires air treatment. Moderate capital costs.
4.	Excavation	No	Difficult because of moderately deep groundwater depth and large lateral extent of hydrocarbons. Large impact to business operating activities. High costs and risk to human exposure.
5.	Enhanced Bioremediation	Yes	Moderately effective at reducing dissolved MTBE in groundwater. Includes injection of MTBE-specific micro-organisms into the saturated zone. Moderately difficult to implement and moderate capital costs.
6.	Natural Attenuation	No	Natural attenuation rates are insufficient due to the close proximity of nearby potential receptors
7.	No Action	No	Well understood, does not reduce mass, easy to implement.

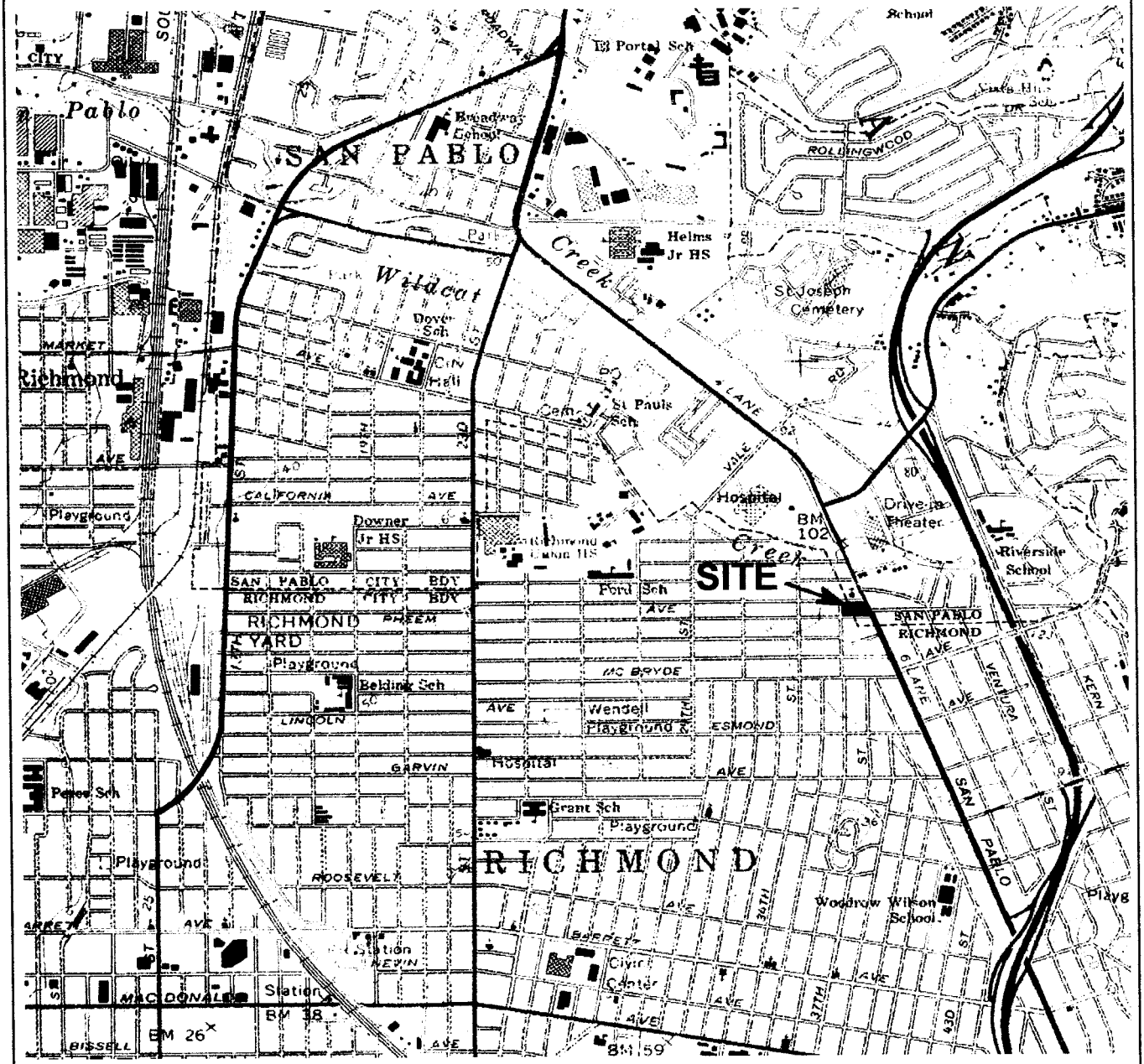
TABLE 4
EVALUATION MATRIX FOR RETAINED REMEDIAL ALTERNATIVES
World Oil Station 24
13013 San Pablo Avenue
San Pablo, California

Evaluation Criteria	Alternative 1 – (Dual-Phase) Groundwater and Soil Vapor Extraction	Alternative 3 – Air Sparging and Soil Vapor Extraction	Alternative 3 – Enhanced Bioremediation
1. Description of Alternative	Groundwater is pumped from existing groundwater monitoring well(s). Pumped groundwater is treated by liquid-phase carbon adsorbers. Treated groundwater is discharged to the storm drain under an NPDES permit. Soil vapors are extracted from groundwater monitoring wells and/or soil vapor extraction wells using a vacuum blower. Extracted soil vapor is treated using a catalytic/thermal oxidizer.	A blower injects air into the saturated zone via air sparge wells. The injected air strips volatile hydrocarbons from the groundwater as it rises to the vadose zone. Soil vapor and air sparge off-gas is extracted from groundwater monitoring wells using a vacuum blower. Extracted soil vapor is treated using a thermal/catalytic oxidizer.	Specialized MTBE degrading microbes are introduced into the subsurface in 3 zones (biobarriers) to intercept MTBE-impacted groundwater. Rows of low-flow sparge wells are used to provide oxygen to the biobarriers. It is anticipated that the supplied oxygen will also stimulate the biodegradation of TPHg and BTEX compounds via native microbes.
2. Level of Protection of Human Health, the Environment, and Beneficial Uses of Ground and Surface Waters	This alternative provides an adequate level of protection of human health, the environment, and beneficial uses of ground and surface waters. Implementation will slightly increase the potential exposure of humans and the environment through the extraction, treatment, and discharge of impacted groundwater. This potential exposure would be limited to a moderate time span and can be controlled by monitoring and proper training of construction and O&M personnel.	This alternative provides an adequate level of protection of human health, the environment, and beneficial uses of ground and surface waters. Implementation will likely increase the potential exposure of humans and the environment through the extraction, treatment, and discharge of impacted vapors. This potential exposure would be limited to a moderate time span and can be controlled by monitoring and proper training of construction and O&M personnel.	This alternative provides an adequate level of protection of human health, the environment, and beneficial uses of ground and surface waters. Implementation will not increase the potential exposure of humans and the environment.
3. Reduction of Hydrocarbons	This alternative will reduce the concentration of contaminants below the site in the capillary fringe and saturated zone. This alternative will also capture contaminants that may have migrated offsite.	This alternative will not effectively reduce the concentration of contaminants beneath the site in the saturated zone. This alternative will not capture off-site contaminants and may generate uncontrollable hydrocarbons vapors in the vadose zone.	This alternative will reduce the concentration of contaminants below the site in the saturated zone. This alternative will not directly treat off-site contaminants.

TABLE 4
EVALUATION MATRIX FOR RETAINED REMEDIAL ALTERNATIVES
World Oil Station 24
13013 San Pablo Avenue
San Pablo, California

Evaluation Criteria	Alternative 1 – Dual-Phase (Groundwater and Soil Vapor Extraction)	Alternative 2 – Air Sparge and Soil Vapor Extraction	Alternative 3 – Enhanced Bioremediation (MTBE-Specific Microorganisms)
4. Implementation and Operation	Moderately difficult to implement. Requires power, connection to storm drain, and construction/O&M of extraction/treatment systems. Some disruption to business operations for the site and possibly neighboring sites during installation and operation of the remediation system.	Moderately difficult to implement. Requires power, installation of air sparge wells, and construction/O&M of extraction/treatment systems. Some disruption to business operations for the site and possibly neighboring sites during installation and operation of the remediation system.	Very difficult to implement. Requires feasibility testing, power, installation of sparge wells, waste discharge permitting, injection of MTBE degrading microbes, and construction/O&M of oxygen injection system. Some disruption to business operations for the site and possibly neighboring sites during installation and operation of the remediation system.
5. Cost Effectiveness	Cost range = $200,000 to $300,000	Cost range = $200,000 to $300,000	Cost range = $250,000 to $350,000.
6. Compliance with Regulatory Guidelines	This alternative can be implemented within regulatory guidelines.	This alternative can be implemented within regulatory guidelines.	This alternative can be implemented within regulatory guidelines.
7. Short Term Effectiveness	This alternative is effective in the short term because it would remove dissolved hydrocarbons in groundwater while impeding further migration toward off-site production wells.	This alternative is moderately effective in the short term because it removes hydrocarbons in the soil and groundwater. However, this method does not effectively reduce off-site migration.	This alternative is slightly effective in the short term. Reduction of hydrocarbon concentrations in groundwater depends on groundwater flow through the biozones. The method does not effectively reduce off-site migration.
8. Long Term Effectiveness	Effective in the long term. When compared to other alternatives, this alternative is the most likely to be effective in the long term.	Effective in the long term.	Effective in the long term. May require extended duration to reach remediation goals.
9. Community Exceptance	No community acceptance problems anticipated for this alternative.	No community acceptance problems anticipated for this alternative.	No community acceptance problems anticipated for this alternative.

FIGURES



LEGEND

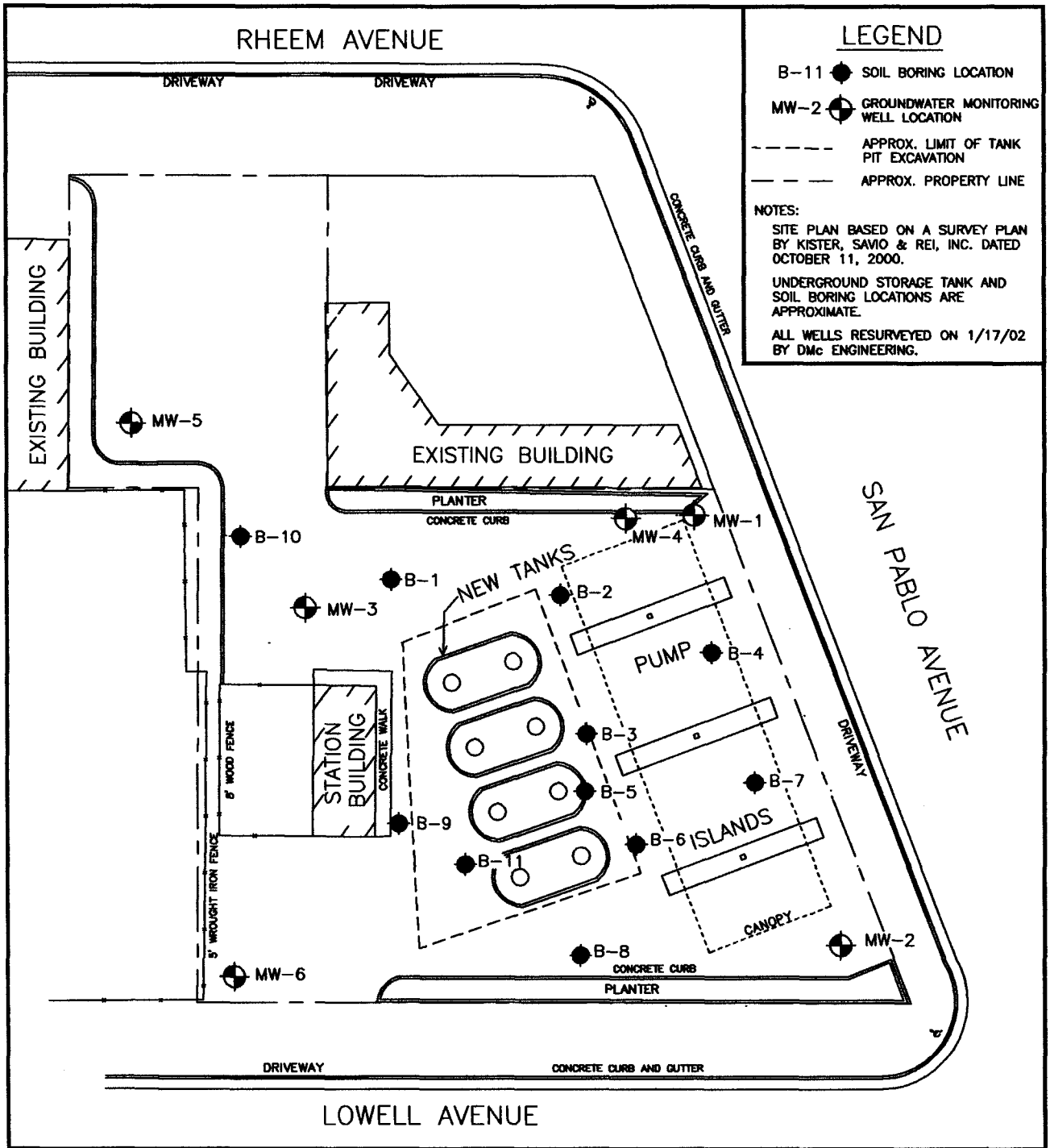
Project No: 90306918	File: WO24 fig1 sitelocmap
Drawn By: KMS	Date: 12/4/03
Client: World Oil Marketing Company	

SITE LOCATION MAP

Site: World Oil Station 24
13013 San Pablo Ave.
San Pablo, California

FIGURE: 1

Geologic Services Corporation
science, engineering & technology
6430 Variel Ave., Suite 103 ● Woodland Hills, CA 91367 ● (818) 226-6900



LEGEND

- B-11 ⊕ SOIL BORING LOCATION
- MW-2 ⊕ GROUNDWATER MONITORING WELL LOCATION
- APPROX. LIMIT OF TANK PIT EXCAVATION
- APPROX. PROPERTY LINE

NOTES:

SITE PLAN BASED ON A SURVEY PLAN BY KISTER, SAVIO & REI, INC. DATED OCTOBER 11, 2000.

UNDERGROUND STORAGE TANK AND SOIL BORING LOCATIONS ARE APPROXIMATE.

ALL WELLS RESURVEYED ON 1/17/02 BY DMc ENGINEERING.

0 10 30
SCALE IN FEET

Project No: 90306918	File: WO24RAPfig2
Drawn By: WFG	Date: 9/02/04
Client: World Oil Marketing Company	
Site: Station 24 13013 San Pablo Ave. San Pablo, California	FIGURE: 2

SITE PLAN
SHOWING SOIL BORING AND WELL LOCATIONS

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science, engineering & technology
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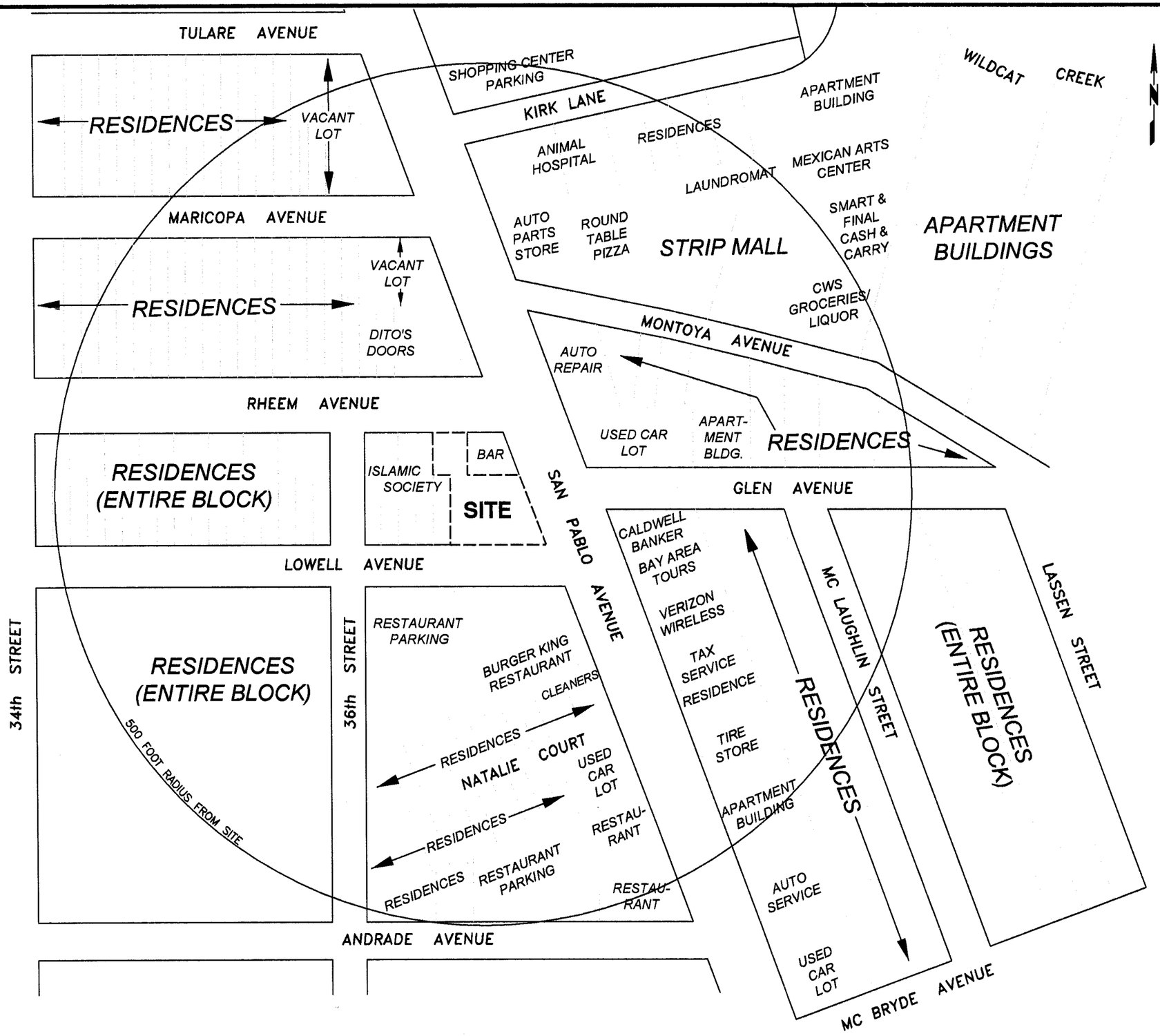

LEGEND

---- SITE BOUNDARY

NOTES:

PROPERTY LINES ARE APPROXIMATE; PLAN IS BASED ON CONTRA COSTA COUNTY ASSESSORS MAPS, NOS. 417-02, 417-21, 523-01, 526-01, 526-02, 526-03, 526-04, AND 526-09.

PROPERTY USAGE BASED ON SITE VICINITY WALK CONDUCTED BY NMWW, INC. PERSONNEL ON AUGUST 27, 2001.

0 150 300
APPROXIMATE SCALE IN FEET

Project No: 90306918	File: WO24RAPfig3
Drawn by: AJK/WFG	Date: 10/19/01
Client: World Oil Marketing Company	

SITE VICINITY MAP SHOWING NEARBY PROPERTY USAGE

Site: World Oil Station 24
13013 San Pablo Avenue
San Pablo, California

FIGURE: 3

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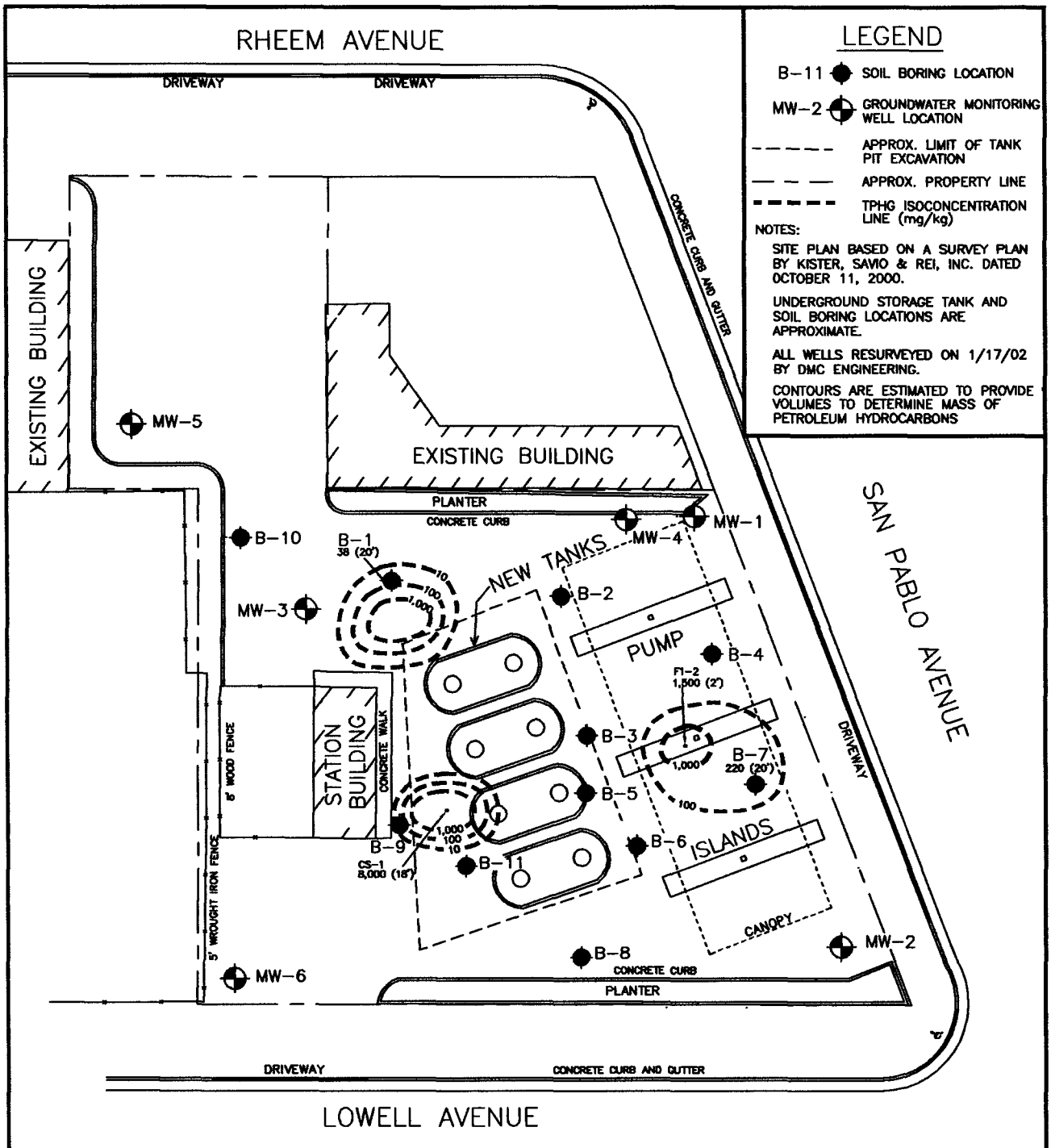

LEGEND

- B-11 ⊕ SOIL BORING LOCATION
- MW-2 ⊕ GROUNDWATER MONITORING WELL LOCATION
- APPROX. LIMIT OF TANK PIT EXCAVATION
- APPROX. PROPERTY LINE
- TPHG ISOCONCENTRATION LINE (mg/kg)

NOTES:

SITE PLAN BASED ON A SURVEY PLAN BY KISTER, SAVIO & REI, INC. DATED OCTOBER 11, 2000.

UNDERGROUND STORAGE TANK AND SOIL BORING LOCATIONS ARE APPROXIMATE.

ALL WELLS RESURVEYED ON 1/17/02 BY DMC ENGINEERING.

CONTOURS ARE ESTIMATED TO PROVIDE VOLUMES TO DETERMINE MASS OF PETROLEUM HYDROCARBONS

0 10 30
SCALE IN FEET

Project No: 90306918	File: WO24RAPfig2
Drawn By: WFG	Date: 9/02/04
Client: World Oil Marketing Company	

SITE PLAN SHOWING TPH CONCENTRATIONS IN SOIL 10' - 20'

Site: Station 24
13013 San Pablo Ave.
San Pablo, California

FIGURE: 4

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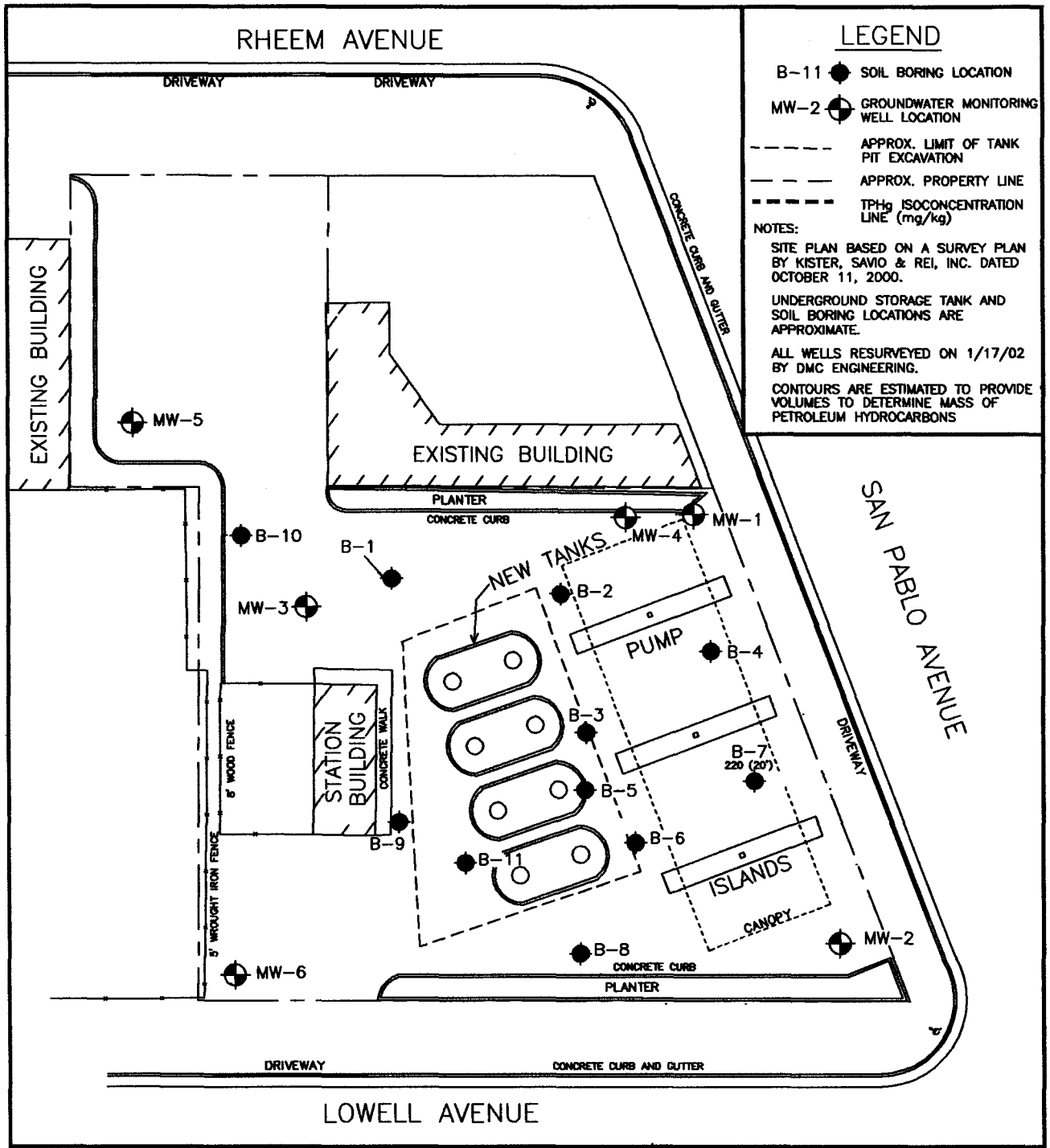

LEGEND

- B-11 — SOIL BORING LOCATION
- MW-2 — GROUNDWATER MONITORING WELL LOCATION
- APPROX. LIMIT OF TANK PIT EXCAVATION
- APPROX. PROPERTY LINE
- TPHg ISOCONCENTRATION LINE (mg/kg)

NOTES:

SITE PLAN BASED ON A SURVEY PLAN BY KISTER, SAVIO & REI, INC. DATED OCTOBER 11, 2000.

UNDERGROUND STORAGE TANK AND SOIL BORING LOCATIONS ARE APPROXIMATE.

ALL WELLS RESURVEYED ON 1/17/02 BY DMC ENGINEERING.

CONTOURS ARE ESTIMATED TO PROVIDE VOLUMES TO DETERMINE MASS OF PETROLEUM HYDROCARBONS

0 10 30
SCALE IN FEET

Project No: 90306918	WO24RAPfig5
Drawn By: WFG	Date: 9/02/04
Client: World Oil Marketing Company	

SITE PLAN SHOWING TPH CONCENTRATIONS IN SOIL 20' - 25'

Site: Station 24
13013 San Pablo Ave.
San Pablo, California

FIGURE: 5

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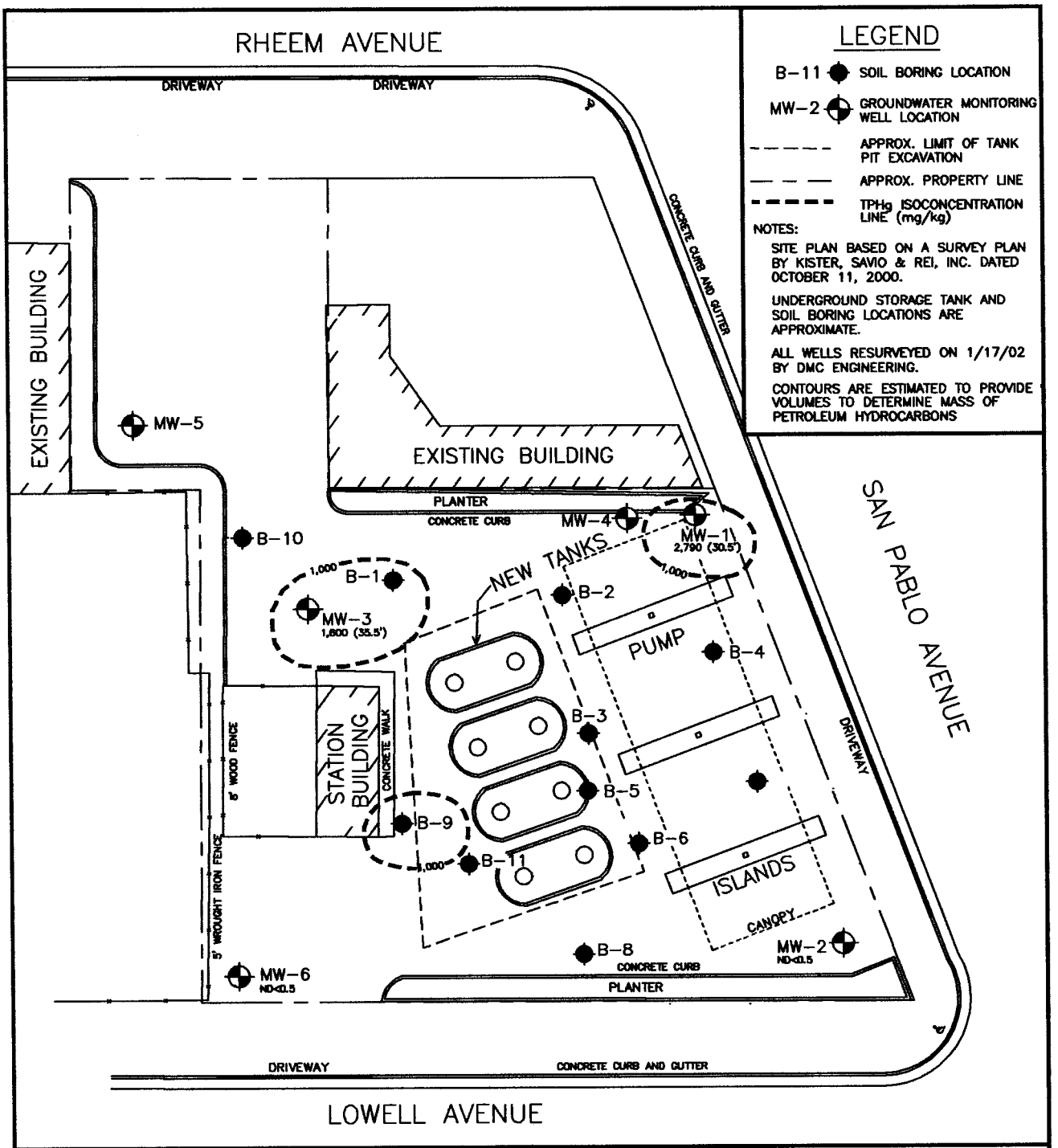

LEGEND

- B-11 — SOIL BORING LOCATION
- MW-2 — GROUNDWATER MONITORING WELL LOCATION
- APPROX. LIMIT OF TANK PIT EXCAVATION
- APPROX. PROPERTY LINE
- TPHg ISOCONCENTRATION LINE (mg/kg)

NOTES:

SITE PLAN BASED ON A SURVEY PLAN BY KISTER, SAVIO & REI, INC. DATED OCTOBER 11, 2000.

UNDERGROUND STORAGE TANK AND SOIL BORING LOCATIONS ARE APPROXIMATE.

ALL WELLS RESURVEYED ON 1/17/02 BY DMC ENGINEERING.

CONTOURS ARE ESTIMATED TO PROVIDE VOLUMES TO DETERMINE MASS OF PETROLEUM HYDROCARBONS

0 10 30
SCALE IN FEET

Project No: 90306918	WO24RAPfig6	**SITE PLAN SHOWING TPH CONCENTRATIONS IN SOIL 25' - 30'**
Drawn By: WFG	Date: 9/02/04	
Client: **World Oil Marketing Company**		
Site: **Station 24, 13013 San Pablo Ave., San Pablo, California**		FIGURE: **6**

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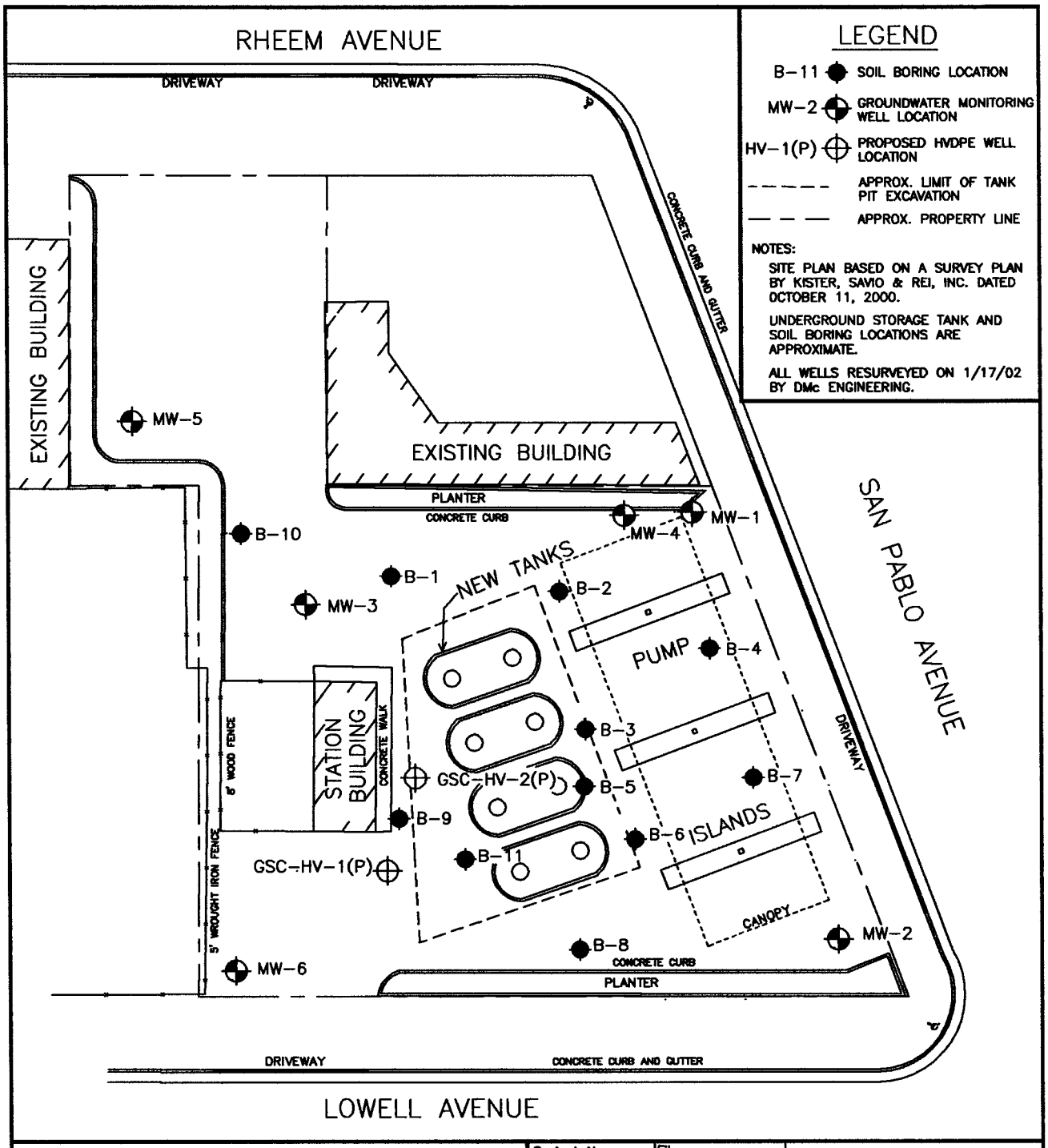

0 10 30
SCALE IN FEET

Project No: 90306918	File: WO24RAPfig7
Drawn By: WFG	Date: 9/02/04
Client: World Oil Marketing Company	

SITE PLAN SHOWING PROPOSED HVDPE WELL LOCATIONS

Site: Station 24
13013 San Pablo Ave.
San Pablo, California

FIGURE: 7

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APPENDIX A

DRILL LOGS

DRILL LOG

Job No. W024-002 Job Name World Oil Station # 24 Phase II Assessment

Site Owner World Oil Marketing Co. Location 13013 San pablo Ave., San Pablo

Surface Elev. _____ Total Hole Depth 31.5 ft. Diameter 10 in.

Top of Casing _____ Water Level: Initial 27.0 ft. Static _____

Screen: Dia. 2 in. Length 7 ft. Type/Size Sch. 40 PVC 0.020 slot

Casing: Dia. 2 in. Length 15 ft. Type PVC

Drilling Co. West Hazmat Drilling Corp. Filter Pack #3 Monterey

Rig Acker Method Hollow Stem Auger

Driller Scott Havens Logged by W. F. Girolamo

Date Drilled 4/13/99 Permit No. M99-327

Checked by: W. F. Girolamo License No. R. G. 5723

WELL No.: MW-1

COMMENTS:
Hand auger first three feet.
Locoted at northeast corner of approach to pump islands.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
0						
1						
2						
3						
4						
5	0.8		7 10 10			0'-15' LEAN CLAY (CL) 80% clay, 20% silt, trace fine sand, dusky brown (5YR 2/2), moderately stiff, slightly moist, no odor, increasing % silt with depth. Same as above, varying % silt with depth, no odor. Becomes dark yellowish brown (10YR4/2) below 5.5 ft.
6						
7						
8						
9						
10	0.9	MW-1-10.5'	7 13 19			Same as above, no odor, becomes grayish olive (10Y4/2) below 10.5 ft.
11						
12						
13						
14						
15	5.9		9 12 15			15'-18' SILT (ML) 60% silt, 40% clay, with thin clayey SAND (SC) layers: 80% fine sand, 20 % clay, moderately stiff, slightly moist, slight hydrocarbon odor in the sands. Trace of angular gravel in silt and sand layers, increasing moisture with depth.
16						
17						
18		MW-1-18.5'				18'-20' POORLY GRADED SAND (SP) 100% fine sand, olive gray (5Y3/2), wet, SANDY SILT (ML), olive gray (5Y3/2), soft, wet, and SILT (ML), olive gray (5Y3/2), stiff, slighly moist, slight hydrocarbon odor.
19			7 9 10			
20						

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DRILL LOG

W024-002, World Oil Station # 24, San Pablo CA

WELL NO.: MW-1

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
20						
21						20'-24' SILT (ML), 80% silt, 20% clay, olive gray (5Y3/2) to dusky brown (5YR 2/2), stiff, slightly moist, no odor.
22						
23						
24						
25	13.1	MW-1-25.5'	10 18 20			24'-29' LEAN CLAY (CL), 80% clay, up to 20% silt, up tp 10% fine to medium sand, plastic, olive gray (5Y3/2), stiff, slightly moist, no odor.
26						
27						▽
28						
29			5			29'-31.5' SILTY SAND (SM), 80% fine to medium sand, 20 % silt, with some thin layers of moderately stiff sandy SILT (ML), olive gray (5Y3/2), saturated, moderate hydrocarbon odor.
30	470	MW-1-30.5'	10 12			
31						Bottom of boring at 31.5 ft.
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						

nmww, inc.

DRILL LOG

Job No. W024-002 Job Name World Oil Station # 24 Phase II Assessment

Site Owner World Oil Marketing Co. Location 13013 San pablo Ave., San Pablo

WELL No.: MW-2

Surface Elev. _____ Total Hole Depth 41.5 ft. Diameter 10 in.

Top of Casing _____ Water Level: Initial 28.25 ft. Static _____

Screen: Dia. 4 in. Length 25 ft. Type/Size Sch. 40 PVC 0.010 slot

Casing: Dia. 4 in. Length 15 ft. Type PVC

Drilling Co. West Hazmat Drilling Corp. Filter Pack #2/12 Sand

Rig Acker Method Hollow Stem Auger

Driller Scott Havens Logged by W. F. Girolamo

Date Drilled 4/12/99 Permit No. M99-328

Checked by: W. F. Girolamo License No. R. G. 5723

COMMENTS:
Hand auger first three feet.
Located at southeast corner of site.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
0						
1						0'-15' LEAN CLAY (CL) 60% clay, 30% silt, 10% medium to coarse angular sand, trace of subangular gravel, plastic, dusky brown (5YR2/2), moderately stiff, slightly moist, no odor, grades into a clayey SILT (ML) below 2 ft.
2						
3						Grades into LEAN CLAY (CL), 70% clay, 30% silt, plastic, dark yellowish brown (10YR4/2), slightly moist, no odor, below 3 ft.
4			7			
5	12.8	MW-2-5.5'	11 13			Same as above, increasing clay content and stiffer with depth, no odor, with trace of angular gravel to 1.5 in.
6						
7						
8						
9			10			
10	3.3		13 17			Same as above, no odor.
11						Grades into a clayey SILT (ML) with depth.
12						
13						
14			13			
15	0.4	MW-2-15.5'	17 20			15'-17' SILT (ML) 60% silt, 20% clay, 20% fine sand, dark yellowish brown (10YR 4/2), moderately dense, slightly moist, no odor, sandier layer at 15.5 ft.
16						
17			9			17'-22' SILT (ML) 80% silt, up to 20% clay, up to 10% fine sand, dark yellowish brown (10YR4/2), soft to moderately dense, moist, no odor, increasing % clay with depth.
18			11 14			Moist SILT at 18.5'-20', increasing moisture with depth, some dusky brown (5YR2/2) mottling with depth, no odor.
19			8 10			
20			13			

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DRILL LOG

W024-002, World Oil Station # 24, San Pablo CA

WELL NO.: MW-2

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
20						
21						Grades into:
22	2.4		10			22'-34' LEAN CLAY (CL), 80% clay, 20% silt, trace fine sand, plastic, dark yellowish brown (10YR4/2), moderately stiff, slightly moist, no odor.
23		MW-2-23'	13 16			
24						stiffer with depth.
25						
26						
27						
28						▽
29			11			Same as above, up to 10% fine sand, no odor.
30	1.2	MW-2-30.5'	18 20			
31						
32						
33						
34			6			34'-41.5' LEAN CLAY (CL), as above, interlayered with SILT (ML) 80% silt, 20% fine sand, saturated, no odor.
35	1.4		8 9			
36						
37						
38						
39						
40			3			Same as above, dark yellowish brown (10YR4/2), silt layers soft, with up to 10% fine to coarse sand and shale fragments, saturated, interlayered with stiff, moist sandy clay, no odor, layers are 2 to 6 in. thick.
41	1.2		10 12			
42						Bottom of boring at 41.5 ft.
43						
44						
45						
46						

NMWW. INC.

DRILL LOG

Job No. W024-003 Job Name World Oil Station # 24 Additional Wells

Site Owner World Oil Marketing Co. Location 13013 San pablo Ave., San Pablo

Surface Elev. _____ Total Hole Depth 40.0 ft. Diameter 8 in.

Top of Casing _____ Water Level: Initial 29.0 ft. Static _____

Screen: Dia. 2 in. Length 20 ft. Type/Size Sch. 40 PVC 0.010 slot

Casing: Dia. 2 in. Length 20 ft. Type PVC

Drilling Co. Cascade Drilling, Inc. Filter Pack #2/12 Sand

Rig CME 75 Method Hollow Stem Auger

Driller Tony Jaromillo Logged by W. F. Girolamo

Date Drilled 7/28/00 Permit No. M00-1843

Checked by: W. F. Girolamo License No. R. G. 5723

WELL NO.: MW-3

COMMENTS:
0.0 to 5.5 ft. previously drilled by West Hazmat Corp. on 4/13/99.

Located north of station building.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
0						0'-0.5' Concrete
1						0.5'-3' SILT (ML) 70% silt, 30% clay, moderately plastic, dusky brown (5YR 2/2), stiff, dry, no odor, with rock fragments, becomes dark yellowish brown (10YR 4/2) with depth.
2						
3						3'-16' LEAN CLAY (CL) 60% clay, 40% silt, moderately plastic, dusky brown (5YR 2/2), stiff, dry to slightly moist, no odor.
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15	0.7	MW3-16	15 19 20			LEAN CLAY (CL), as above, >80% clay, 10% silt, < 10% fine sand, dark yellowish brown (10YR 4/2), dry to slightly moist, stiff, no odor.
16			11			16'-17' Clayey SAND (SC) 80% fine sand, 20% clay, dark yellowish brown (10YR 4/2), stiff, dry to slightly moist, no odor.
17			15 15			17'-40' LEAN CLAY (CL) 100% clay, moderate brown (5YR 4/4) with dusky brown (5YR 2/2) mottling, medium stiff, dry to slightly moist, no odor, becomes stiffer below 18 ft.
18			25			
19			28 31			
20						

nmww, inc.

DRILL LOG

WO24-003, World Oil Station # 24, San Pablo CA

WELL NO.: MW-3

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
20			16 22 19			LEAN CLAY (CL), as above, no odor.
21	0.4					
22			35 50/2"			LEAN CLAY, as above, becomes dark yellowish brown (10YR 4/2) with some grayish olive green (5GY 3/2) mottling, hard, slight increase in moisture and grayish olive green mottling with depth, very faint hydrocarbon odor below 25 ft.
23	1.6					
24			12 29 35			
25	16					
26			13 18 22			
27	63					
28			30 50/3"			
29	628	MW3-29			▽	LEAN CLAY (CL), as above, becomes wet (one-half foot zone) at 29 ft., moderate hydrocarbon odor, becomes less hard with depth, slightly moist below 29.5 ft.
30			13 16 19			
31	457					
32			18 32 50/3"			LEAN CLAY (CL), as above, alternating moist and wet zones below 32 ft., moderate to strong hydrocarbon odor.
33	760					
34			14 18 24			LEAN CLAY (CL), as above, becomes grayish olive green (5GY 3/2) with dark greenish gray (5G 4/1) mottling below 34 ft., strong hydrocarbon odor.
35	861	MW3-35.5				
36			9 17 31			LEAN CLAY (CL), as above, saturated zones where clay is fractured below 36 ft., otherwise moist, strong hydrocarbon odor.
37	291					
38			21 35			LEAN CLAY (CL), as above, with thin layers of clay containing sand and gravel.
39	71	MW3-39.5	39			
40						Bottom of boring at 40.0 ft.
41						
42						
43						
44						
45						
46						

nmww. inc.

DRILL LOG

Job No. W024-003 Job Name World Oil Station # 24 Additional Wells

Site Owner World Oil Marketing Co. Location 13013 San pablo Ave., San Pablo

WELL No.: MW-4

Surface Elev. _____ Total Hole Depth 39.5 ft. Diameter 8 in.

Top of Casing _____ Water Level: Initial 30.0 ft. Static _____

Screen: Dia. 2 in. Length 18 ft. Type/Size Sch. 40 PVC 0.010 slot

Casing: Dia. 2 in. Length 20 ft. Type PVC

Drilling Co. Cascade Drilling, Inc. Filter Pack #2/12 Sand

Rig CME 75 Method Hollow Stem Auger

Driller Tony Jaramillo Logged by W. F. Girolamo

Date Drilled 7/28/00 Permit No. M00-1844

Checked by: W. F. Girolamo License No. R. G. 5723

COMMENTS:
Hand auger first five feet.
Located west of MW-1.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
0						0'-0.5' Concrete
1						0.5'-18' LEAN CLAY (CL) 80% clay, 20% silt, plastic, dusky brown (5YR 2/2), medium stiff, slightly moist, no odor, trace of sand and subangular gravel with depth, becomes dusky yellowish brown (10YR 2/2) below 4 ft.
2						
3						
4	0.4					
5		MW4-5				
6						
7						
8						
9						
10						
11						
12						
13						
14						
15	0.2					LEAN CLAY (CL), as above, dark yellowish brown (10YR 4/2), no odor, becomes medium dark gray (N4) with moderate brown ((5YR 4/4) mottling below 17 ft., slightly moist, faint (hydrocarbon?) odor.
16			6			
17	1.1	MW4-17.5	9 6			LEAN CLAY with well graded sand at 17.5 ft.
18			7			18'-18.5' Poorly Graded SAND (SP) 100% fine sand, medium dark gray (N4), slightly moist, faint (hydrocarbon?) odor at 18 ft.
19	2.0		8 13			18.5'-26.5' LEAN CLAY (CL) 60% clay, 40% silt, moderately plastic, grayish olive green (5GY 3/2), slightly moist, no odor.
20						

NMWW. INC.

DRILL LOG

W024-003, World Oil Station # 24, San Pablo CA

WELL NO.: MW-4

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
20			20			LEAN CLAY (CL), as above, becomes stiffer, dusky yellowish brown (10YR 2/2) below 20 ft., then grayish olive green (5GY 3/2) below 21 ft.
21			25			
22			19			Clayey SAND (SC) layer at 21.5 to 22 ft., below CLAY is dusky yellowish brown (10YR 2/2), stiff, no odor, with up to 10% fine to coarse angular sand at 23.5 ft.
23	0.2		15			
24			19			LEAN CLAY, as above, with some thin layers of sandy CLAY and faint hydrocarbon odor below 24 ft.
25	13.9		24			
26			19			
27	241	MW4-27.5	20			26.5'-30' Clayey SAND (SC) 70% fine to medium angular to subangular sand, 30% clay, grayish olive green (5GY 3/2), medium dense, slightly moist, moderate hydrocarbon odor, hydrocarbon odor becomes stronger with depth, varying % clay with depth.
28			23			
29	850		9			
30			15			
31	263	MW4-31	20			30'-34' Clayey SAND (SC) 80% fine sand, 20% clay, grayish green (10G 4/2), loose to medium dense, saturated, moderate hydrocarbon odor, alternating in 8-in. to 1 ft. layers with sandy LEAN CLAY (CL) 60% clay, 20% fine to medium sand, 10% silt, grayish green, stiff, slightly moist, moderate hydrocarbon odor.
32			13			
33	328		15			
34	86		19			34'-34.5' Fractured CLAY, saturated.
35			13			34.5'-39.5' LEAN CLAY (CL) 100% plastic clay, grayish green (10G 4/2) with moderate brown (5YR 4/4) mottling, stiff, slightly moist, faint hydrocarbon odor, no odor below 36 ft., moderate brown below 36 ft.
36			18			
37			25			
38			25			Bottom of boring at 38.0 ft.
39	7.5	MW4-39.5	24			Bottom of sampling interval at 39.5 ft.
40			25			
41			12			
42			18			
43			22			
44			26			
45			25			
46			29			

DRILL LOG

Job No. W024-006 Job Name World Oil Station # 24 Well Installation

Site Owner World Oil Marketing Co. Location 13013 San Pablo Ave., San Pablo, CA

WELL NO.: MW-5

Surface Elev. _____ Total Hole Depth 40.0 ft. Diameter 8 in.

Top of Casing _____ Water Level: Initial 35.0 ft. (est.) Static 30.6 ft. BGS

Screen: Dia. 2 in. Length 20 ft. Type/Size Sch. 40 PVC 0.010 slot

Casing: Dia. 2 in. Length 19.5 ft. Type Sch. 40 PVC

Drilling Co. Gregg Drilling, Inc. Filter Pack 2/16 Sand

Rig Mobil B-61 Method Hollow Stem Auger

Driller Jason Neff Logged by W. F. Girolamo

Date Drilled 8/27/01 Permit No. 01-1987

Checked by: W. F. Girolamo License No. R. G. 5723

COMMENTS:
Hand auger first 5 feet. Located in the southwest corner of the northern portion of the site.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
0						
1						0'-0.33' Asphalt.
						0.33'-0.66' Gravelly SAND Road Base.
2		MW 5-2				0.66'-8' Silty SAND (SM) 80% fine sand, 20% silt, dark yellowish brown (10YR 4/2), loose, dry to slightly moist, no odor, with some wood fragments.
3						
4	0.0					
5		MW 5-5	4			
6		MW 5-6 (Physical)	7 5			Silty SAND (SM) as above, no odor, % silt decreases with depth.
7						
8						8'-19' Lean CLAY (CL) 100% moderately plastic clay, trace of fine sand, dark
9			5 7			brown (10YR 4/2), medium stiff, dry to slightly moist, no odor, interlayered
10	0.0	MW 5-10	10 5			with thinner zones of clayey SAND (SC) up to 70% fine to medium sand,
11		MW 5-11.5 (Physical)	12 14			30% clay, dark yellowish brown (10YR 4/2), medium dense, dry to slightly moist, no odor.
12						
13						
14	0.0	MW5-14.5 (Physical)	5 12			Lean CLAY (CL) as above, moderately plastic clay, with up to 10% fine sand, soft to medium stiff, slightly moist, no odor, with some black (natural) carbon deposits.
15		MW5-15	14			
16						
17						
18						
19	0.0	MW5-19.5 (Physical)	10 12			19'-20' Clayey SAND (SC) 80% fine to coarse angular sand, 20% clay, grayish
20		MW 5-20	14			brown (5YR 3/2), medium dense, moist, no odor.

AMWW. INC.

DRILL LOG

W024-006, World Oil Station #24, San Pablo, CA

WELL NO.: MW-5

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
20–21–22–23						20'–37' Lean CLAY (CL) >90% plastic clay, <10% fine sand, grayish brown (5YR 3/2), medium stiff, moist, no odor.
24	0.0					Lean CLAY (CL) as above, with varying amounts (up to 10%) of fine sand, trace of coarse sand, minimal iron oxide staining; below 24 ft. becomes 100% clay, moderate olive brown (5Y 4/4) with moderate yellowish brown (10YR 5/4) mottling, stiffer, no to possible faint hydrocarbon odor below 24.5 ft., medium stiff below 25 ft.
25		MW5-25				
26–27–28						
29	0.0	MW5-29.5 (Physical) MW5-30	8 10 14			Lean CLAY (CL) as above, plastic, trace of fine sand, mottled, but predominantly moderate yellowish brown (10YR 5/4), soft to medium stiff, slightly moist to moist, no to faint hydrocarbon odor.
30–31–32–33						
34	0.0	MW5-35	5 6 8			Lean CLAY (CL) as above, with some zones of up to 30% fine sand, soft, no odor, increasing moisture with depth. ▽
35–36–37						37'–39.25' Poorly Graded SAND (SP) 100% fine to medium sand, grayish olive green (5GY 3/2), medium dense, saturated, moderate hydrocarbon odor.
38–39	1252	MW5-39.5 (Physical) MW5-40	5 30 31			39.25'–40' Silty SAND with Gravel (SC) 60% fine to coarse angular to subangular sand, 20% subrounded gravel to 0.5 in., 20% silt, grayish olive green (5GY 3/2) with some moderate brown (5YR 3/4) mottling, dense, saturated, faint to moderate hydrocarbon odor, with some carbonized plant fragments.
40						Bottom of boring at 40.0 ft.
41–42–43–44–45–46						

NMWW. INC.

DRILL LOG

Job No. W024-006 Job Name World Oil Station # 24 Well Installation

Site Owner World Oil Marketing Co. Location 13013 San Pablo Ave., San Pablo, CA

WELL No.: MW-6

Surface Elev. _____ Total Hole Depth 40.0 ft. Diameter 8 in.

Top of Casing _____ Water Level: Initial 29.5 ft. Static 30.7 ft. BGS

Screen: Dia. 2 in. Length 20 ft. Type/Size Sch. 40 PVC 0.010 slot

Casing: Dia. 2 in. Length 19.5 ft. Type Sch. 40 PVC

Drilling Co. Gregg Drilling, Inc. Filter Pack 2/16 Sand

Rig Mobil B-61 Method Hollow Stem Auger

Driller Jason Neff Logged by W. F. Girolamo

Dote Drilled 8/27/01 Permit No. 01-1989

Checked by: W. F. Girolamo License No. R. G. 5723

COMMENTS:
Hand auger first 5 feet.
Located in the southwest corner of the site.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
0						0'-0.5' Concrete.
1						0.5'-5' Poorly Graded SAND (SP) 100% fine sand, trace of silt, moderate yellowish brown (10YR 5/4), medium dense, dry, no odor, with some gravel and possibly cobbles below 4.5 ft. - difficult to hand auger.
2		MW 6-2				
3						
4						
5		MW 6-5				Poorly Graded SAND (SP) as above, with subrounded gravel and pebbles.
6	0.0		12 18 15			5'-7.5' Interlayered (3-in. to 6-in. layers) Poorly Graded SAND (SP) as above and Lean CLAY (CL) 80% plastic clay, 20% fine sand, dark yellowish brown (10YR 4/2), medium stiff, dry to slightly moist, no odor.
7						
8						7.5'-19.5' Lean CLAY (CL) 100% clay, trace of fine sand, dark yellowish brown (10YR 4/2), medium stiff, moist, no to faint (hydrocarbon?) odor, odor becomes faint with depth.
9	9.5		17 18			
10		MW 6-10	36 17			
11		MW 6-11.5 (Physical)	27 21			
12						
13						
14	38.9		5 17			Lean CLAY (CL) as above, alternating layers of 100% clay with >90% clay and up to 10% fine sand, faint hydrocarbon odor.
15		MW6-15	21			
16						
17						
18						
19	0.0	MW6-19.5	15 50/5"			Lean CLAY (CL) as above, increasing % fine sand with depth. 19.5'-20' Well Graded GRAVEL with Sand and Cobbles (GW) subrounded gravel and cobble fragments mixed with sand, could not drive sampler.
20						

MWW, INC.

DRILL LOG

W024-006, World Oil Station #24, San Pablo, CA

WELL NO.: MW-6

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
20			50/6"			20'-22.5' Well Graded SAND with Gravel (SW) 70% fine to coarse angular sand, 30% gravel and larger rock fragments, dark yellowish orange (10YR 6/6), dense, dry, no odor.
21						
22						
23						22.5'-24' Poorly Graded SAND with Clay (SP-SC) 90% fine to medium subangular sand with lesser coarse sand, 10% clay, pale yellowish brown (10YR 6/2), medium dense, dry, no odor.
24	0.0		22 18			24'-40' SILT (ML) 60% silt, 30% plastic clay, 10% fine sand, moderate olive brown (5Y 4/4) with some dusky red (5R 3/4) iron oxide mottling, medium stiff, dry to slightly moist, no odor.
25		MW6-25	20			
26						
27						
28						
29	3.2		6 8			SILT (ML) as above, moderate olive brown (5Y 4/4) with inclusions of moderate yellowish brown (10YR 5/4) medium sand, soft to medium stiff, slightly moist, silt has faint hydrocarbon odor, becoming wet, no sand, with depth. ▽
30		MW6-30	11			
31						
32						
33						
34	37.7		3 6			SILT (ML) as above, with about 70% silt, 20% clay, up to 10% fine sand, moderately plastic, moderate olive brown (5Y 4/4), soft, saturated, becomes mottled moderate olive brown with moderate yellowish brown (10YR 5/4) below 34 ft., faint hydrocarbon odor, with possible increasing % clay with depth.
35		MW6-35	11			
36						
37						
38						
39	0.0		3 6			SILT (ML) as above, decreasing % clay and increasing % fine sand with depth, moderate yellowish brown (10YR 5/4), soft, saturated, no odor, grades into:
40		MW6-40	8			40' Silty SAND (SM) 60% fine sand, 40% silt, loose to medium dense, saturated, no odor. Bottom of boring at 40.0 ft.
41						
42						
43						
44						
45						
46						

DRILL LOG

Job No. W024-012 Job Name World Oil Station # 24 Well Installation

Site Owner World Oil Marketing Co. Location 13013 San Pablo Ave., San Pablo, CA

Well No.: MW-7

Surface Elev. _____ Total Hole Depth 41.5 ft. Diameter 8 in.

Top of Casing _____ Water Level: Initial 31.5 ft. Static 25.31 ft.

Screen: Dia. 2 in. Length 20 ft. Type/Size Sch. 40 PVC 0.010 slot

Casing: Dia. 2 in. Length 20 ft. Type Sch. 40 PVC

Drilling Co. Gregg Drilling, Inc. Filter Pack 2/16 Sand

Rig Mobile D-3 Method Hollow Stem Auger

Driller Chris St. Pierre Logged by B. Aweinat

Date Drilled 9/04/02 Permit No. 02-1844

Checked by: W. F. Girolamo License No. R. G. 5723

COMMENTS:
Hand auger first 4 feet.
Located on south side of Rheem Avenue near the southeast corner of Rheem Avenue and 36th Street.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
0						0'-0.42' Asphalt.
1						0.42'-8.5' Clayey SAND (SC) with trace silt, no odor.
2						
3						
4						
5						
6						Clayey SAND (SC) as above, 60 to 70% fine-grained sand with trace silt, moderately plastic clay, dark brown (10YR 4/2), loose, moist, no odor.
7						
8						
9						8.5'-13.5' SILT (ML) with fine-grained sand and slightly plastic clay, dark brown (10YR 4/2), soft to medium-stiff, moist, no odor, decreasing % clay with depth.
10			5			
11	0.0	MW7-11.5	8 12			
12						
13						
14						13.5'-28' Lean CLAY (CL) with silt and sand, plastic, grayish-brown (5YR 3/2), soft to medium-stiff, very moist, no odor.
15						
16						
17						
18						
19						Lean CLAY (CL) as above, faint odor.
20						

nmww. inc.

DRILL LOG

W024-012, World Oil Station #24, San Pablo, CA

Well No.: MW-7

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
20						
21	0.0	MW7-21.5	3 8 13			Lean CLAY (CL) as above, faint odor.
22						
23						
24						
25						Lean CLAY (CL) as above, slightly moist, no odor.
26						
27						
28						28'-33' SILT (ML) with some sand, medium-stiff, slightly moist, no odor.
29						
30			5			
31	0.0	MW7-31.5	5 6			
32						
33						33'-41.5' Lean CLAY (CL) with some silts, medium-stiff to stiff, wet, no odor.
34						
35						
36						
37						
38						
39						
40			5			Lean CLAY (CL) as above, no odor.
41	0.0	MW7-41.5	6 5			Bottom of boring at 40.0 ft. Bottom of sampling interval at 41.5 ft.
42						
43						
44						
45						
46						

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DRILL LOG

Job No. W024-012 Job Name World Oil Station # 24 Well Installation

Site Owner World Oil Marketing Co. Location 13013 San Pablo Ave., San Pablo, CA

Well No.: MW-8

Surface Elev. _____ Total Hole Depth 41.0 ft. Diameter 8 in.

Top of Casing _____ Water Level: Initial 29.5 ft. (est.) Static 27.91 ft. BGS

Screen: Dia. 2 in. Length 20 ft. Type/Size Sch. 40 PVC 0.010 slot

Casing: Dia. 2 in. Length 20 ft. Type Sch. 40 PVC

Drilling Co. Gregg Drilling, Inc. Filter Pack 2/16 Sand

Rig CME-53 Method Hollow Stem Auger

Driller Chris St. Pierre Logged by B. Aweinat

Date Drilled 9/04/02 Permit No. 02-1845

Checked by: W. F. Girolamo License No. R. G. 5723

COMMENTS:
Hand auger first 4 feet.
Located on east side of 36th Street between Rheem Avenue and Lowell Avenue.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
0						0'-0.42' Asphalt.
1						0.42'-4.5' Lean CLAY (CL) with trace silt, no odor.
2						
3						
4						
5						4.5'-8' SILT (ML) with trace sand, soft to medium-stiff, no odor.
6						
7						
8						8'-13' SILT (ML) with trace clay, medium-stiff to stiff, no odor.
9						
10			5			
11	22.5	MW8-11.5	7 10			
12						
13						
14						13'-18' Poorly Graded SAND with silt (SP-SM) with some gravel, loose, no odor.
15						
16						
17						
18						
19						18'-23' Lean CLAY (CL) with trace silt, no odor.
20						

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DRILL LOG

W024-012, World Oil Station #24, San Pablo, CA

Well No.: MW-8

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ Recovery	Graphic Log	Well Construc.	Description
20						
21	27.8	MW8-21.5	3 5 5			
22						23'-28' SILT (ML) with trace clay, medium-stiff, moist, no odor.
23						
24						
25						
26						
27						
28						28'-33' Lean CLAY (CL), medium-stiff, wet, no odor.
29						
30			4			
31	2.6	MW8-31.5	5 8			
32						
33						33'-41' SILT (ML) with trace sand, medium-stiff, wet, no odor.
34						
35						
36						
37						
38						
39						
40	2.9	MW8-41	4			SILT (ML) as above, with trace clay, medium-stiff, wet, no odor. Bottom of boring at 40.0 ft.
41			7 7			Bottom of sampling interval at 41 ft.
42						
43						
44						
45						
46						

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APPENDIX B

GROUNDWATER MONITORING AND SAMPLING REPORT
FIRST QUARTER 2005

Date: April 14, 2005

Geologic Services Corporation
science, engineering & technology

WORLD OIL MARKETING COMPANY
QUARTERLY MONITORING AND STATUS REPORT
First Quarter 2005

Site Name:	World Oil Marketing Company Station #24
Site Location:	13013 San Pablo Ave., San Pablo, CA 94806
Client Contact/Phone No.:	Mr. John Hundley/(562) 928-0100
Consulting Co./Contact/Phone No.:	GSC/Gretchen Faulkner/(818) 226-6900
Sampling Contractor/Contact/Phone No.:	Wayne Perry/Truedi Balsitis/(714) 826-0352
Lead Agency:	RWQCB, SF Bay Region
Lead Agency Contact/Phone:	Ms. Barbara Sieminski/(510) 622-2423
Lead Agency File Number:	07-0756 (BGS)
Other Regulatory Agencies/cc's:	NA

WORK PERFORMED THIS QUARTER (FIRST-2005)

1. Wayne Perry, Inc. gauged groundwater monitoring well MW-1 (dry), and gauged, purged, and sampled groundwater monitoring wells MW-2 through MW-8 on February 10, 2005.

WORK PROPOSED FOR NEXT QUARTER (SECOND-2005)

1. Perform quarterly groundwater monitoring and sampling during April or May 2005.
2. Complete *Feasibility Study and Remedial Action Plan* with cost analysis.

MONITORING RESULTS FOR FIRST QUARTER 2005:

Current Phase of Project	Assessment, Monitoring	(Assess., Remed., etc.)
Frequency of GW Monitoring/Sampling:	Quarterly	(Quarterly, etc.)
Wells Monitored/Sampled this Quarter:	MW-1 (dry), MW-2 to MW-8	
Depth to Groundwater:	19.92 to 24.56	(range in feet)
Groundwater Flow Direction/Magnitude:	Northwest/0.012	(ft/ft)
Flow/Gradient Consistent w/Previous Quarters:	Yes, in general	(Yes/No)
TPHg Concentration Range:	ND<100 to 26,000	(ug/L)
Benzene Concentration Range:	ND<0.5 to 660	(ug/L)
Highest Benzene Concentration:	MW-3	(well)
MTBE Concentration Range:	ND<2 to 24	(ug/L)
Highest MTBE Concentration	MW-4	(well)
Free Product Present/Wells:	No	(Yes/No)
Wells and/or Surface Waters within 2,000 ft.:	Wildcat Creek, Wells 07-385*, 07-386* 07-388*, 197035*	(Name/ID)
Radius & Their Respective Directions:	800 ft. NE, 1,300 ft. NNW, 1,300 ft. NNW, 425 ft. E, 1,500 ft. NE	(Distance and Direction)
Current Remediation Methods:	N/A	(VES, Prod. Rem., etc.)
LPH Recovered this Quarter:	N/A	(gallons)
Gallons of GW Purged this Quarter:	67 (includes decon water)	(gallons)
Disposal/Recycling Facility:	DeMenno-Kerdoon, Compton,CA	(Name and Location)

Summary of Unusual Activity: None.

Agency Directive Requirements:

Quarterly groundwater monitoring and sampling.
The SFRWQCB, in a telephone conversation with GSC on March 19, 2003, requested a feasibility screening to compare the cost of remediation options with on-going monitoring and sampling.

Notes: *Not known if wells still exist

PREPARED BY: Geologic Services Corporation

REVIEWED AND APPROVED BY:

William F. Girolamo, P.G.
Geologic Services Corporation

Date: April 14, 2005

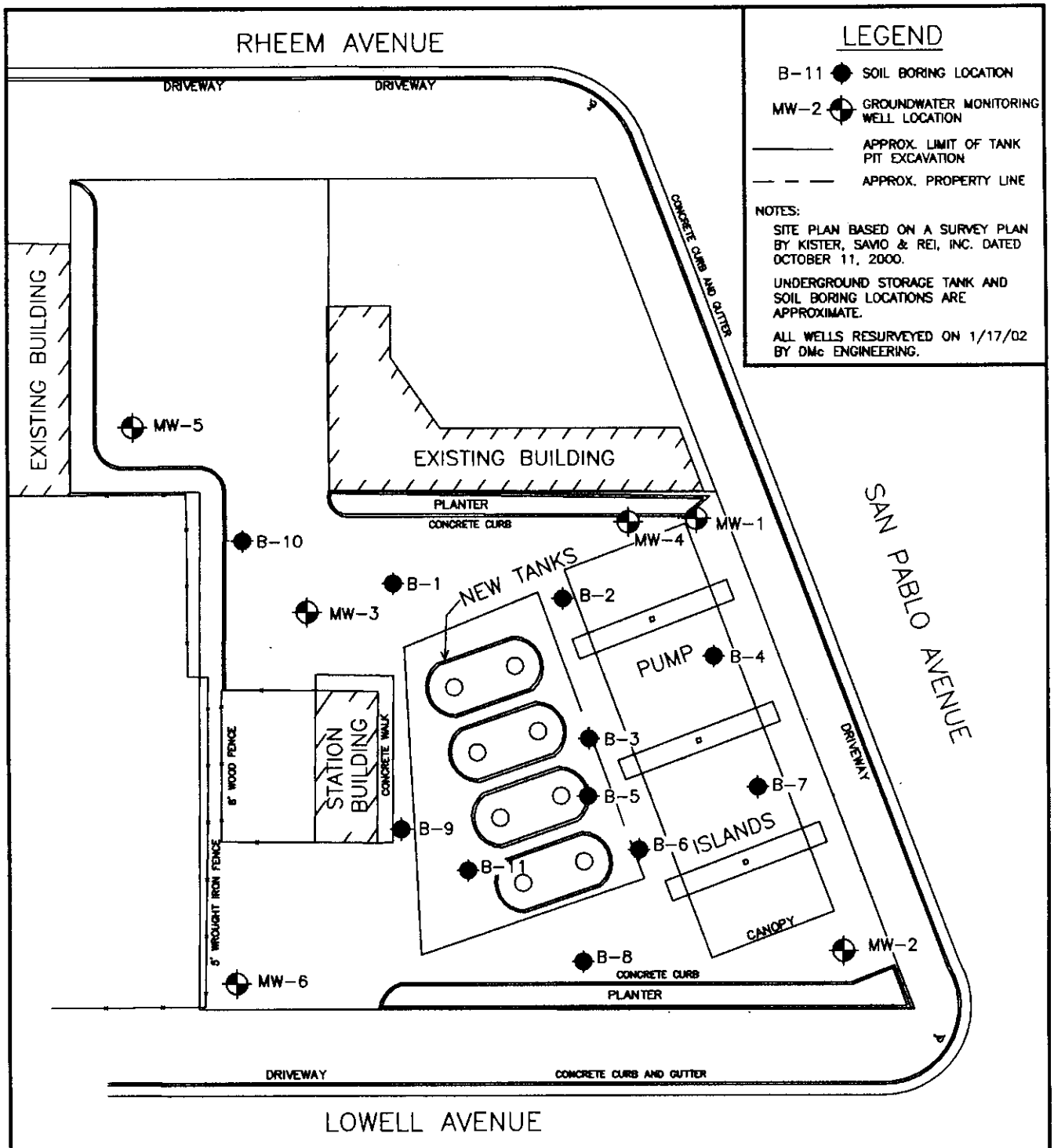
ATTACHMENTS:

Site Plan Showing On-Site Soil Boring and Well Locations (Figure 1)
Site Vicinity Map Showing Groundwater Gradient and Hydrocarbon Concentrations (Figure 2)
Groundwater Monitoring and Analytical Results (Table 1)
Water Analyses for Natural Attenuation Parameters (Table 2)
Historical Groundwater Monitoring and Analytical Results (Table 3)
Historical Water Analyses for Natural Attenuation Parameters (Table 4)
Historical Additional Oxygenate Analytes (Table 5)
Laboratory Report and Chain of Custody Record
Wayne Perry, Inc. Groundwater Monitoring and Sampling Field Data Sheets
Waste Disposal Documents

DISTRIBUTION LIST:

Ms. Barbara Sieminski, SFRWQCB
Mr. John P. Hundley, World Oil Marketing Company

FIGURES



LEGEND

B-11 ● SOIL BORING LOCATION

MW-2 ⊕ GROUNDWATER MONITORING WELL LOCATION

——— APPROX. LIMIT OF TANK PIT EXCAVATION

— — — APPROX. PROPERTY LINE

NOTES:

SITE PLAN BASED ON A SURVEY PLAN BY KISTER, SAVIO & REI, INC. DATED OCTOBER 11, 2000.

UNDERGROUND STORAGE TANK AND SOIL BORING LOCATIONS ARE APPROXIMATE.

ALL WELLS RESURVEYED ON 1/17/02 BY DMc ENGINEERING.

0 10 30

SCALE IN FEET

Project No: 90306918G	File: WO24GWMSfig1
Drawn By: WFG/NH	Date: 3/1/05
Client: World Oil Marketing Company	
Site: Station 24, 13013 San Pablo Ave., San Pablo, CA	FIGURE: 1

SITE PLAN SHOWING ON-SITE SOIL BORING AND WELL LOCATIONS

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science, engineering & technology
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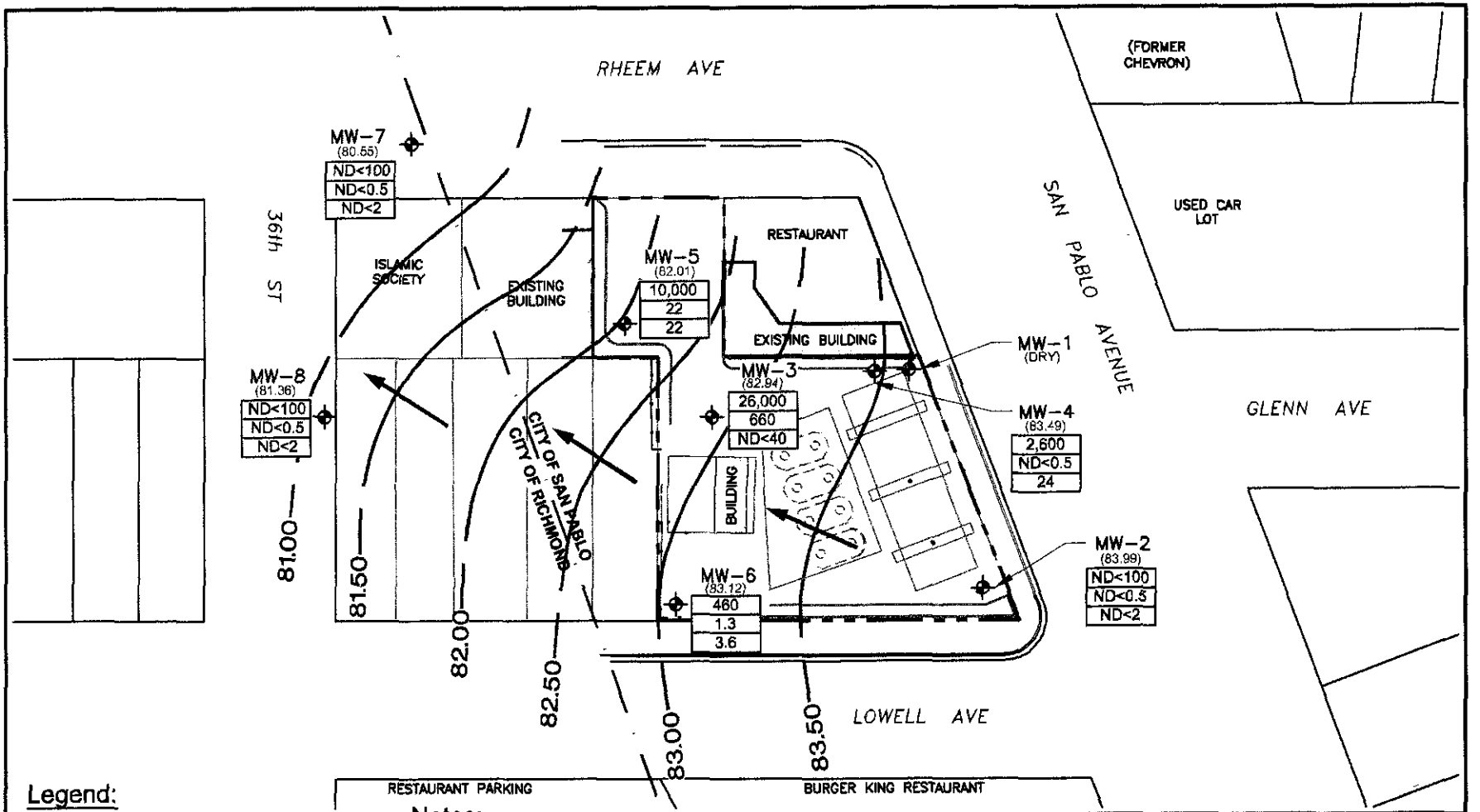

Legend:

- SITE BOUNDARY
- APPROX. CITY BOUNDARY LINE
- MW-7 — GROUNDWATER MONITORING WELL LOCATION
- (83.99) — GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- 81.00 — GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL, DASHED WHERE INFERRED
- GROUNDWATER FLOW DIRECTION
- TPHg / Benzene / MTBE — ALL CONCENTRATIONS IN ug/L. TPHG BY EPA METHOD 8260B. BENZENE BY EPA METHOD 8260B. MTBE BY EPA METHOD 8260B.

Notes:

1. SITE PLAN BASED ON A SURVEY PLAN BY KISTER, SAVID & REI, INC. DATED OCTOBER 11, 2000.
2. UNDERGROUND STORAGE TANK AND SOIL BORING LOCATIONS ARE APPROXIMATE.
3. ON-SITE WELLS RESURVEYED ON 1/17/02, OFF-SITE WELLS SURVEYED ON 10/30/02 BY DMc ENGINEERING.
4. PROPERTY LINES ARE APPROXIMATE; PLAN IS BASED ON CONTRA COSTA COUNTY ASSESSORS MAPS.
5. PROPERTY USAGE BASED ON SITE VICINITY WALK CONDUCTED BY NMWW, INC. PERSONNEL ON AUGUST 27, 2001.
6. THIS PLAN PRESENTS ONE INTERPRETATION. OTHER INTERPRETATIONS ARE POSSIBLE.

0 60
SCALE IN FEET

Project No: 90306918	File: WO24gwmsfig2
Drawn By: NH	Date: 3/05
Client: World Oil Marketing Company	
Site: Station 24, 13013 San Pablo Ave., San Pablo, CA	FIGURE: 2

SITE VICINITY MAP SHOWING GROUNDWATER GRADIENT AND HYDROCARBON CONCENTRATIONS FEBRUARY 10, 2005

Geologic Services Corporation
science, engineering & technology
6430 Variel Ave., Suite 103 • Woodland Hills, CA 91367 • (818) 226-6900

TABLES

TABLE 1
GROUNDWATER MONITORING AND ANALYTICAL RESULTS - QUARTER 1, 2005
WORLD OIL STATION NO. 24
13013 SAN PABLO AVENUE, SAN PABLO, CALIFORNIA

Well Number	Well Diameter	Screen Interval	Sample Date	Wellhead Elevation	Depth to H2O (feet)	Depth to Product (feet)	Product Thickness (feet)	Total Depth (feet)	GW Elevation (feet)	EPA Method 8260B					
										TPHg (C4-C12) (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	Toluene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-1	2"	15-22	2/10/2005	107.17	DRY	N/A	0.00	19.58	--	--	--	--	--	--	--
MW-2	4"	15-40	2/10/2005	108.55	24.56	N/A	0.00	39.05	83.99	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-3	2"	20-40	2/10/2005	105.35	22.41	N/A	0.00	40.02	82.94	26,000	660	1,300	90	2,670	ND<40
MW-4	2"	20-38	2/10/2005	106.57	23.08	N/A	0.00	37.55	83.49	2,600	ND<0.5	6.5	0.73	ND<1.5	24
MW-5	2"	19.5-39.5	2/10/2005	104.36	22.35	NA	0.00	39.50	82.01	10,000	22	150	18	571	22
MW-6	2"	19.5-39.5	2/10/2005	105.62	22.50	N/A	0.00	39.52	83.12	460	1.3	0.91	ND<0.5	ND<1.5	3.6
MW-7	2"	20-40	2/10/2005	100.47	19.92	N/A	0.00	39.50	80.55	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-8	2"	20-40	2/10/2005	102.36	21.00	N/A	0.00	39.74	81.36	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
QCTB*	--	--	--	--	--	--	--	--	--	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2

NOTES:
All groundwater monitoring and sampling conducted by Wayne Perry, Inc.
Groundwater samples analyzed by American Analytics in Chatsworth, California.
TPHg = total petroleum hydrocarbons characterized as gasoline.
MTBE = methyl tertiary-butyl ether.
µg/L = micrograms per liter.
ND <100 = not detected above the respective Method Reporting Limit.
-- = not analyzed/measured.
Groundwater elevation in feet above mean sea level.
Depth to water measured in feet from top of casing.
Well elevations resurveyed by DMc Engineering on January 17, 2002.
*QCTB = trip blank analyzed for TPHg and BTEX/MTBE (EPA 8260B).

TABLE 2
WATER ANALYSES FOR NATURAL ATTENUATION PARAMETERS
WORLD OIL STATION NO. 24
13013 SAN PABLO AVENUE, SAN PABLO, CALIFORNIA

Well Number	Sample Date	Ferrous Iron SM3500-D (mg/L)	Nitrate EPA 300.0 (mg/L)	Sulfate EPA 300.0 (mg/L)	pH	Dissolved Oxygen (DO) (g/L)	Redox Potential (ORP) (mv)
MW-2	02/10/05	ND<0.1	10	20	6.18-6.30	14.09, 13.68	261, 395
MW-3	02/10/05	2.1	ND<0.1	ND<0.5	6.49-6.67	14.83, 7.89	289, -67
MW-4	02/10/05	--	--	--	6.54-6.71	10.94, 12.42	376, 222
MW-5	02/10/05	1.2	0.16	19	6.65-6.76	14.35, 12.04	236, -67
MW-6	02/10/05	--	--	--	6.70-6.77	12.68, 12.65	246, 340
MW-7	02/10/05	--	--	--	6.68-6.79	14.43, 11.85	330, 358
MW-8	02/10/05	0.12	1.2	17	6.71-6.86	14.28, 10.04	246, 214

Notes:
All groundwater monitoring and sampling conducted by Wayne Perry, Inc.
Groundwater samples analyzed by American Analytics in Chatsworth, California.
ND<0.1 = not detected above the respective limit of quantitation.
mg/L = milligrams per liter.
ppm = parts per million.
mv = millivolts.
ORP = oxidation reduction potential.
DO and ORP values are down-hole field readings, pre and post purge (xx, xx).
pH values show the lowest to highest field readings.
-- = not analyzed.

TABLE 3
HISTORICAL GROUNDWATER MONITORING AND ANALYTICAL RESULTS
WORLD OIL STATION NO. 24
13013 SAN PABLO AVENUE, SAN PABLO, CALIFORNIA

Well Number	Well Diameter	Screen Intervals	Sample Date	Wellhead Elevation	Depth to H2O (feet)	Depth to Product (feet)	Product Thickness (feet)	Total Depth (feet)	GW Elevation (feet)	EPA (8015M) or 8260B	EPA Method (8020) or 8260B				
										TPHg (C4-C12) (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	Toluene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-1	2"	15-22	12/7/1999	--	DRY	DRY	--	19.41	--	--	--	--	--	--	--
MW-1	2"	15-22	5/8/2000	--	DRY	DRY	--	19.42	--	--	--	--	--	--	--
MW-1	2"	15-22	8/8/2000	107.17	DRY	DRY	--	19.61	--	--	--	--	--	--	--
MW-1	2"	15-22	11/16/2000	107.17	DRY	DRY	--	19.50	--	--	--	--	--	--	--
MW-1	2"	15-22	2/5/2001	107.17	DRY	DRY	--	19.32	--	--	--	--	--	--	--
MW-1	2"	15-22	5/3/2001	107.17	DRY	DRY	--	19.38	--	--	--	--	--	--	--
MW-1	2"	15-22	7/31/2001	107.17	DRY	DRY	--	19.32	--	--	--	--	--	--	--
MW-1	2"	15-22	11/14/2001	107.17	DRY	DRY	--	19.32	--	--	--	--	--	--	--
MW-1	2"	15-22	2/6/2002	107.17	DRY	DRY	--	19.43	--	--	--	--	--	--	--
MW-1	2"	15-22	5/2/2002	107.17	DRY	DRY	--	19.50	--	--	--	--	--	--	--
MW-1	2"	15-22	7/31/2002	107.17	DRY	DRY	--	19.39	--	--	--	--	--	--	--
MW-1	2"	15-22	10/30/2002	107.17	DRY	DRY	--	19.50	--	--	--	--	--	--	--
MW-1	2"	15-22	1/30/2003	107.17	DRY	N/A	0.00	19.50	--	--	--	--	--	--	--
MW-1	2"	15-22	5/14/2003*	107.17	DRY	N/A	0.00	19.51	--	--	--	--	--	--	--
MW-1	2"	15-22	6/3/2003	107.17	DRY	N/A	0.00	19.51	--	--	--	--	--	--	--
MW-1	2"	15-22	7/29/2003	107.17	DRY	N/A	0.00	19.54	--	--	--	--	--	--	--
MW-1	2"	15-22	10/30/2003	107.17	DRY	N/A	0.00	19.50	--	--	--	--	--	--	--
MW-1	2"	15-22	1/14/2004	107.17	DRY	N/A	0.00	19.55	--	--	--	--	--	--	--
MW-1	2"	15-22	4/21/2004	107.17	DRY	N/A	0.00	19.59	--	--	--	--	--	--	--
MW-1	2"	15-22	8/11/2004	107.17	DRY	N/A	0.00	19.54	--	--	--	--	--	--	--
MW-1	2"	15-22	11/4/2004	107.17	DRY	N/A	0.00	19.59	--	--	--	--	--	--	--
MW-1	2"	15-22	2/10/2005	107.17	DRY	N/A	0.00	19.58	--	--	--	--	--	--	--
MW-2	4"	15-40	12/7/1999	--	31.84	N/A	0.00	38.96	--	(ND<100)	(4.4)	(1.8)	(5.1)	(4.1)	(ND<10)
MW-2	4"	15-40	5/8/2000	--	25.25	N/A	0.00	38.97	--	(ND<100)	(ND<0.5)	(ND<0.5)	(ND<0.5)	(ND<1)	(ND<5)
MW-2	4"	15-40	8/8/2000	108.62	29.00	N/A	0.00	39.00	79.62	(ND<100)	(ND<0.5)	(ND<0.5)	(ND<0.5)	(ND<1.5)	ND<5
MW-2	4"	15-40	11/16/2000	108.62	31.64	N/A	0.00	39.00	76.98	(ND<100)	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-2	4"	15-40	2/5/2001	108.62	31.78	N/A	0.00	38.94	76.84	(ND<100)	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-2	4"	15-40	5/3/2001	108.62	28.33	N/A	0.00	38.99	80.29	(200)	18	ND<0.5	5.4	23.8	27
MW-2	4"	15-40	7/31/2001	108.62	29.58	N/A	0.00	38.94	79.04	(ND<100)	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-2	4"	15-40	11/14/2001	108.62	33.85	N/A	0.00	38.94	74.77	(130)	12	4.4	6.1	20.7	ND<2
MW-2	4"	15-40	2/6/2002	108.55	27.06	N/A	0.00	38.94	81.49	ND<100	1.2	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-2	4"	15-40	5/2/2002	108.55	28.53	N/A	0.00	39.10	80.02	ND<100	0.67	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-2	4"	15-40	7/31/2002	108.55	31.18	N/A	0.00	38.96	77.37	ND<100	1.2	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-2	4"	15-40	10/30/2002	108.55	33.71	N/A	0.00	39.10	74.84	750	60	16	120	97	2.4
MW-2	4"	15-40	1/30/2003	108.55	26.77	N/A	0.00	39.05	81.78	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-2	4"	15-40	5/14/2003*	108.55	27.82	N/A	0.00	39.07	80.73	--	--	--	--	--	--
MW-2	4"	15-40	6/3/2003	108.55	28.47	N/A	0.00	38.81	80.08	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-2	4"	15-40	7/29/2003	108.55	30.42	N/A	0.00	39.09	78.13	131	2.5	0.89	ND<0.5	ND<1.5	1.0J
MW-2	4"	15-40	10/30/2003	108.55	32.26	N/A	0.00	39.11	76.29	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-2	4"	15-40	1/14/2004	108.55	28.58	N/A	0.00	39.09	79.97	1,400	150	1.7	4.5	78	4.1
MW-2	4	15-40	4/21/2004	108.55	27.51	N/A	0.00	39.05	81.04	ND<100	0.63	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-2	4"	15-40	8/11/2004	108.55	30.87	N/A	0.00	39.01	77.68	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-2	4"	15-40	11/4/2004	108.55	31.75	N/A	0.00	39.06	76.80	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-2	4"	15-40	2/10/2005	108.55	24.56	N/A	0	39.05	83.99	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-3	2"	20-40	8/8/2000	105.46	26.45	N/A	0.00	40.11	79.01	(71,000)	(3,800)	(2,800)	(800)	(14,000)	ND<500
MW-3	2"	20-40	11/16/2000	105.46	28.83	N/A	0.00	39.75	76.63	(58,000)	1,800	2,200	460	13,100	57
MW-3	2"	20-40	2/5/2001	105.46	28.81	N/A	0.00	39.80	76.65	(54,000)	2,100	2,400	560	1,100	55
MW-3	2"	20-40	5/3/2001	105.46	25.49	N/A	0.00	39.88	79.97	(47,000)	1700	1800	260	7410	ND<200
MW-3	2"	20-40	7/31/2001	105.46	29.18	N/A	0.00	39.80	76.28	(43,000)	220	200	29	814	6.1
MW-3	2"	20-40	11/14/2001	105.46	32.08	N/A	0.00	39.80	73.38	(38,000)	3,000	1,800	590	7,600	79
MW-3	2"	20-40	2/6/2002	105.35	24.48	N/A	0.00	39.80	80.87	18,000	1,100	1,400	250	5,440	43
MW-3	2"	20-40	5/2/2002	105.35	26.05	N/A	0.00	39.95	79.30	37,000	2,100	1,900	190	6,200	ND<200

TABLE 3
HISTORICAL GROUNDWATER MONITORING AND ANALYTICAL RESULTS
WORLD OIL STATION NO. 24
13013 SAN PABLO AVENUE, SAN PABLO, CALIFORNIA

Well Number	Well Diameter	Screen Intervals	Sample Date	Wellhead Elevation	Depth to H2O (feet)	Depth to Product (feet)	Product Thickness (feet)	Total Depth (feet)	GW Elevation (feet)	EPA (8015M) or 8260B	EPA Method (8020) or 8260B				
										TPHg (C4-C12) (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	Toluene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-3	2"	20-40	7/31/2002	105.35	28.59	N/A	0.00	39.85	76.76	37,000	1,600	2,100	240	5,540	ND<100
MW-3	2"	20-40	10/30/2002	105.35	31.73	N/A	0.00	39.85	73.62	44,000	2,500	2,400	230	5,330	ND<100
MW-3	2"	20-40	1/30/2003	105.35	23.99	N/A	0.00	39.95	81.36	34,000	1,200	1,100	170	5,170	29
MW-3	2"	20-40	5/14/2003*	105.35	25.12	N/A	1.00	39.97	80.23	--	--	--	--	--	--
MW-3	2"	20-40	6/3/2003	105.35	25.90	N/A	0.00	39.70	79.45	32,000	1,100	1,600	98	4,055	38
MW-3	2"	20-40	7/29/2003	105.35	27.86	N/A	0.00	40.00	77.49	34,000	1,200	2,600	100	3,666	36J
MW-3	2"	20-40	10/30/2003	105.35	31.21	N/A	0.00	39.95	74.14	34,000	2,100	2,200	140	3,975	49
MW-3	2"	20-40	1/14/2004	105.35	25.17	N/A	0.00	40.00	80.18	36,000	770	1,600	190	5,010	ND<100
MW-3	2	20-40	4/21/2004	105.35	25.03	N/A	0.00	39.96	80.32	27,000	840	1,100	93	2,647	ND<100
MW-3	2"	20-40	8/11/2004	105.35	29.30	N/A	0.00	39.89	76.05	32,000	1,500	2,200	150	5,410	ND<40
MW-3	2"	20-40	11/4/2004	105.35	30.00	N/A	0.00	39.99	75.35	32,000	1,400	2,100	200	4,120	ND<40
MW-3	2"	20-40	2/10/2005	105.35	22.41	N/A	0.00	40.02	82.94	26,000	660	1,300	90	2,670	ND<40
MW-4	2"	20-38	8/8/2000	106.62	27.00	N/A	0.00	37.83	79.62	(23,000)	(1.3)	(59)	(1.1)	(80.9)	8.3
MW-4	2"	20-38	11/16/2000	106.62	28.96	N/A	0.00	37.60	77.66	(16,000)	ND<0.5	41	ND<0.5	40.8	14
MW-4	2"	20-38	2/5/2001	106.62	28.77	N/A	0.00	37.43	77.85	(8,600)	ND<0.5	26	ND<0.5	24.5	17
MW-4	2"	20-38	5/3/2001	106.62	26.23	N/A	0.00	37.62	80.39	(4,800)	ND<0.5	3.4	ND<0.5	4.8	7.1
MW-4	2"	20-38	7/31/2001	106.62	29.49	N/A	0.00	37.42	77.13	(17,000)	ND<0.5	23	ND<0.5	9.39	14
MW-4	2"	20-38	11/14/2001	106.62	31.55	N/A	0.00	37.43	75.07	(3,800)	ND<0.5	8.2	ND<0.5	3.6	17
MW-4	2"	20-38	2/6/2002	106.57	25.06	N/A	0.00	37.43	81.51	3,500	0.53	13	0.55	3.5	39
MW-4	2"	20-38	5/2/2002	106.57	26.60	N/A	0.00	37.60	79.97	170	0.61	26	0.79	4.6	39
MW-4	2"	20-38	7/31/2002	106.57	28.68	N/A	0.00	37.48	77.89	3,900	ND<0.5	28	1.1	5.69	12
MW-4	2"	20-38	10/30/2002	106.57	31.13	N/A	0.00	37.65	75.44	4,800	0.52	11	0.78	ND<6.7	60
MW-4	2"	20-38	1/30/2003	106.57	24.60	N/A	0.00	37.53	81.97	4,700	ND<0.5	15	0.73	ND<1.5	15
MW-4	2"	20-38	5/14/2003*	106.57	25.61	N/A	0.00	37.55	80.96	--	--	--	--	--	--
MW-4	2"	20-38	6/3/2003	106.57	26.36	N/A	0.00	37.22	80.21	2,700	ND<0.5	7.5	ND<0.5	ND<1.5	14
MW-4	2"	20-38	7/29/2003	106.57	28.11	N/A	0.00	37.53	78.46	3,000	ND<0.5	15	ND<0.5	10.6**	7.4
MW-4	2"	20-38	10/30/2003	106.57	30.81	N/A	0.00	37.47	75.76	4,200	ND<0.5	9.1	1.5	1.1	76
MW-4	2"	20-38	1/14/2004	106.57	25.21	N/A	0.00	37.44	81.36	4,100	ND<0.5	1.6	0.80	ND<1.5	17
MW-4	2	20-38	4/21/2004	106.57	25.35	N/A	0.00	37.42	81.22	2,400	ND<0.5	2.6	0.81	ND<1.5	1.5
MW-4	2"	20-38	8/11/2004	106.57	29.26	N/A	0.00	37.31	77.31	2,500	ND<0.5	3.9	0.59	ND<1.5	8.5
MW-4	2"	20-38	11/4/2004	106.57	29.45	N/A	0.00	37.45	77.12	2,000	ND<0.5	4.2	1.3	ND<1.5	60
MW-4	2"	20-38	2/10/2005	106.57	23.08	N/A	0.00	37.55	83.49	2,600	ND<0.5	6.5	0.73	ND<1.5	24
MW-5	2"	19.5-39.5	11/14/2001	--	31.53	N/A	0.00	39.30	--	(71,000)	4,900	2,900	6,600	21,800	ND<200
MW-5	2"	19.5-39.5	2/6/2002	104.36	24.56	N/A	0.00	39.30	79.80	22,000	260	900	960	6,400	ND<100
MW-5	2"	19.5-39.5	5/2/2002	104.36	26.10	N/A	0.00	39.25	78.26	61,000	230	820	330	1,210	ND<200
MW-5	2"	19.5-39.5	7/31/2002	104.36	28.52	N/A	0.00	38.80	75.84	57,000	56	480	120	2,700	57
MW-5	2"	19.5-39.5	10/30/2002	104.36	31.26	31.25	0.01	38.80	73.10	--	--	--	--	--	--
MW-5	2"	19.5-39.5	1/30/2003	104.36	23.68	N/A	0.00	38.95	80.68	21,000	82	250	76	1370	32
MW-5	2"	19.5-39.5	5/14/2003*	104.36	24.98	N/A	0.00	38.98	79.38	--	--	--	--	--	--
MW-5	2"	19.5-39.5	6/3/2003	104.36	25.82	N/A	0.00	38.65	78.54	12,000	38	170	31	970	45'
MW-5	2"	19.5-39.5	7/29/2003	104.36	27.75	N/A	0.00	38.79	76.61	27,000	24	410	54	1,650	ND<20
MW-5	2"	19.5-39.5	10/30/2003	104.36	30.80	NA	0.00	38.92	73.56	43,000	280	690	240	3,090	39
MW-5	2"	19.5-39.5	1/14/2004	104.36	24.42	N/A	0.00	38.91	79.94	12,000	76	130	47	620	46
MW-5	2	19.5-39.5	4/21/2004	104.36	24.82	N	0.00	38.93	79.54	8,600	9.1	39	6.2	410	41
MW-5	2"	19.5-39.5	8/11/2004	104.36	28.96	NA	0.00	39.27	75.40	7,500	9.6	20	2.6	79	31
MW-5	2"	19.5-39.5	11/4/2004	104.36	29.52	NA	0.00	39.30	74.84	6,000	6	21	2.8	76	33
MW-5	2"	19.5-39.5	2/10/2005	104.36	22.35	NA	0.00	39.50	82.01	10,000	22	150	18	571	22
MW-6	2"	19.5-39.5	11/14/2001	--	32.07	N/A	0.00	39.45	--	(3,500)	0.99	0.52	ND<0.5	2.2	ND<2
MW-6	2"	19.5-39.5	2/6/2002	105.62	24.73	N/A	0.00	39.45	80.89	ND<100	1.2	ND<0.5	ND<0.5	ND<1.5	4.0
MW-6	2"	19.5-39.5	5/2/2002	105.62	26.15	N/A	0.00	39.45	79.47	430	1.2	1.4	ND<0.5	ND<1.5	3.4
MW-6	2"	19.5-39.5	7/31/2002	105.62	28.80	N/A	0.00	39.42	76.82	3,200	2.3	8.4	0.57	ND<1.5	2.8
MW-6	2"	19.5-39.5	10/30/2002	105.62	31.64	N/A	0.00	39.64	73.98	3,900	2.6	7.2	0.57	ND<1.5	3.3
MW-6	2"	19.5-39.5	1/30/2003	105.62	24.39	N/A	0.00	39.45	81.23	450	4.0	2.0	ND<0.5	ND<1.5	1.8

TABLE 3
HISTORICAL GROUNDWATER MONITORING AND ANALYTICAL RESULTS
WORLD OIL STATION NO. 24
13013 SAN PABLO AVENUE, SAN PABLO, CALIFORNIA

Well Number	Well Diameter	Screen Intervals	Sample Date	Wellhead Elevation	Depth to H2O (feet)	Depth to Product (feet)	Product Thickness (feet)	Total Depth (feet)	GW Elevation (feet)	EPA (8015M) or 8260B	EPA Method (8020) or 8260B				
										TPHg (C4-C12) (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	Toluene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-6	2"	19.5-39.5	5/14/2003*	105.62	25.52	N/A	0.00	39.49	80.10	--	--	--	--	--	--
MW-6	2"	19.5-39.5	6/3/2003	105.62	26.12	N/A	0.00	39.20	79.50	240	ND<0.5	0.69	ND<0.5	ND<1.5	ND<2
MW-6	2"	19.5-39.5	7/29/2003	105.62	28.05	N/A	0.00	39.51	77.57	640	0.89	0.76	ND<0.5	ND<1.5	2.1
MW-6	2"	19.5-39.5	10/30/2003	105.62	31.13	N/A	0.00	39.45	74.49	2,300	1.80	3.50	ND<0.5	2.7	3.4
MW-6	2"	19.5-39.5	1/14/2004	105.62	26.53	N/A	0.00	39.49	79.09	220	4.2	0.62	ND<0.5	ND<1.5	3.0
MW-6	2	19.5-39.5	4/21/2004	105.62	25.20	N/A	0.00	39.50	80.42	130	0.7	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-6	2"	19.5-39.5	8/11/2004	105.62	29.39	N/A	0.00	39.38	76.23	1,100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	2.5
MW-6	2"	19.5-39.5	11/4/2004	105.62	30.54	N/A	0.00	39.49	75.08	280	0.83	ND<0.5	ND<0.5	ND<1.5	3.2
MW-6	2"	19.5-39.5	2/10/2005	105.62	22.50	N/A	0.00	39.52	83.12	460	1.3	0.91	ND<0.5	ND<1.5	3.6
MW-7	2"	20-40	10/30/2002	--	26.45	N/A	0.00	39.50	--	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-7	2"	20-40	1/30/2003	100.47	19.83	N/A	0.00	39.46	80.64	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-7	2"	20-40	5/14/2003*	100.47	20.74	N/A	0.00	39.36	79.73	--	--	--	--	--	--
MW-7	2"	20-40	6/3/2003	100.47	21.82	N/A	0.00	39.15	78.65	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-7	2"	20-40	7/29/2003	100.47	22.88	N/A	0.00	39.12	77.59	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-7	2"	20-40	10/30/2003	100.47	26.29	N/A	0.00	39.41	74.18	96J	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-7	2"	20-40	1/14/2004	100.47	20.78	N/A	0.00	39.25	79.69	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-7	2	20-40	4/21/2004	100.47	21.00	N/A	0.00	39.29	79.47	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-7	2"	20-40	8/11/2004	100.47	24.78	N/A	0.00	39.31	75.69	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-7	2"	20-40	11/4/2004	100.47	24.90	N/A	0.00	39.50	75.57	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-7	2"	20-40	2/10/2005	100.47	19.92	N/A	0.00	39.50	80.55	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-8	2"	20-40	10/30/2002	--	29.15	N/A	0.00	39.37	--	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-8	2"	20-40	1/30/2003	102.36	26.20	N/A	0.00	39.70	76.16	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-8	2"	20-40	5/14/2003*	102.36	24.85	N/A	0.00	39.66	77.51	--	--	--	--	--	--
MW-8	2"	20-40	6/3/2003	102.36	25.42	N/A	0.00	39.44	76.94	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-8	2"	20-40	7/29/2003	102.36	26.30	N/A	0.00	39.62	76.06	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-8	2"	20-40	10/30/2003	102.36	29.07	N/A	0.00	39.60	73.29	77J	ND<0.5	0.54	ND<0.5	ND<1.5	0.71J
MW-8	2"	20-40	1/14/2004	102.36	22.86	N/A	0.00	39.40	79.50	ND<100	ND<0.5	0.54	ND<0.5	ND<1.5	ND<2
MW-8	2	20-40	4/21/2004	102.36	23.53	N/A	0.00	39.42	78.83	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-8	2"	20-40	8/11/2004	102.36	27.48	N/A	0.00	39.57	74.88	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-8	2"	20-40	11/4/2004	102.36	27.94	N/A	0.00	39.76	74.42	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2
MW-8	2"	20-40	2/10/2005	102.36	21.00	N/A	0.00	39.74	81.36	ND<100	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<2

Notes:

TPHg = total petroleum hydrocarbons characterized as gasoline.

MTBE = methyl tertiary-butyl ether.

µg/L = micrograms per liter.

ND <50 = not detected above the respective detection limit.

-- = not analyzed/measured.

J= estimated value.

Depth to water measured in feet from top of casing.

Groundwater elevation in feet above mean sea level.

Well elevations re-surveyed by DMc Engineering on January 17, 2002.

*May 14, 2003, the samples collected were stolen at the site.

TABLE 4
HISTORICAL WATER ANALYSES FOR NATURAL ATTENUATION PARAMETERS
WORLD OIL STATION NO. 24
13013 SAN PABLO AVENUE
SAN PABLO, CALIFORNIA

Well Number	Sample Date	Ferrous Iron SM3500-D (mg/L)	Nitrate EPA 300.0 (mg/L)	Sulfate EPA 300.0 (mg/L)	pH	Dissolved Oxygen (DO) (ppm)	Redox Potential (ORP) (mv)
MW-2	07/31/01	ND<0.1	15	63	6.6 - 6.7	--	4
MW-2	11/14/01	ND<0.1	9.7	39	6.9-7.1	6.4, 3.2	45, 32
MW-2	02/06/02	ND<0.1	7.1	46	6.2-6.5	6.1, 3.0	115, 139
MW-2	05/02/02	ND<0.1	10	80	6.65-6.66	4.4, 3.8	140, 12
MW-2	07/31/02	ND<0.1	9.9	48	6.7-6.8	3.2, 2.6	141, 150
MW-2	10/30/02	ND<0.1	--	48	6.73-6.88	5.3, 6.6	256, 240
MW-2	01/30/03	ND<0.1	4.8	28	--	--	--
MW-2	06/03/03	ND<0.1	9.1	53	6.20-6.54	8.2,9.1	167,131
MW-2	07/29/03	ND<0.1	10	37	7.43-7.83	11.7, 13.3	91, 95
MW-2	10/30/03	ND<0.1	7.6	37	6.67-6.76	8.2, 7.2	194, 175
MW-2	01/14/04	ND<0.1	1.2	20	6.16-6.52	9.5, 9.1	85, 202
MW-2	04/21/04	--	--	--	6.70-6.80	9.4, 8.5	-130, 7
MW-2	08/11/04	ND<0.1	5.0	25	6.21	12.2, 11.1	395, 458
MW-2	11/04/04	--	--	--	6.25	6.63, 7.98	204, 149
MW-2	02/10/05	ND<0.1	10	20	6.18, 6.30	14.09, 13.68	261, 395
MW-3	07/31/01	1.2	ND<0.1	ND<1	6.6 - 6.7	--	-19
MW-3	11/14/01	ND<0.1	ND<0.1	ND<1	7.1 - 7.2	1.7, 1.3	-2, -30
MW-3	02/06/02	1.0	ND<0.1	ND<0.5	6.5	1.0, 1.4	29, 8
MW-3	05/02/02	0.87	ND<0.1	ND<0.5	6.60-6.61	0.8, 3.0	-11, -40
MW-3	07/31/02	1.7	ND<0.1	ND<0.5	6.7	1.2, 1.0	-40, -37
MW-3	10/30/02	2.9	--	ND<0.5	6.29-6.47	1.4, 2.6	99, 82
MW-3	01/30/03	0.77	ND<0.1	ND<0.5	7.05-7.18	5.1, 5.2	-18, 13
MW-3	06/03/03	1.4	ND<0.1	ND<0.5	5.95-6.01	3.9,4.5	-68, -61
MW-3	07/29/03	1.1	ND<0.1	ND<0.5	7.05-7.77	13.4, 13.8	-66, -95
MW-3	10/30/03	1.9	ND<0.1	ND<0.5	6.65-6.72	4.3, 3.4	-98, -76
MW-3	01/14/04	1.3	ND<0.1	0.56	6.13-6.52	10.5, 6.6	-70, -68
MW-3	04/21/04	--	--	--	6.61-6.71	4.8, 8.5	-129, -98
MW-3	08/11/04	2.6	ND<0.1	ND<0.5	5.94-5.97	8.4, 11.1	91, 187
MW-3	11/04/04	--	--	--	6.36-6.44	8.87, 8.30	-45, -23
MW-3	02/10/05	2.1	ND<0.1	ND<0.5	6.49, 6.67	14.83, 7.89	289, -67
MW-4	07/31/01	2.4	ND<0.1	11	6.7 - 6.9	0.3	-40
MW-4	11/14/01	ND<0.1	ND<0.1	18	7.0-7.2	0.8, 0.4	-71, -95
MW-4	02/06/02	2.7	ND<0.1	8.9	6.5-6.6	1.4, 1.2	11, -62
MW-4	05/02/02	2.1	ND<0.1	9.1	6.67-6.76	2.1, 4.0	-93, -73
MW-4	07/31/02	1.3	ND<0.1	13	6.7-6.8	1.6, 1.4	-75, -52
MW-4	10/30/02	2.2	--	10	6.56-6.64	1.9, 3.2	-43, -60
MW-4	01/30/03	2.1	ND<0.1	10	6.91-7.12	7.3, 7.1	110, -82
MW-4	06/03/03	1.0	ND<0.1	15	5.64-5.88	6.7,8.5	-112, -112
MW-4	07/29/03	2.4	ND<0.1	11	6.89-7.06	13.2, 14.2	-102, -98
MW-4	10/30/03	2.5	ND<0.1	8.1	6.78-6.83	1.0, 2.4	-127, -109
MW-4	01/14/04	--	--	--	6.16-6.31	10.4, 8.1	-110, -121
MW-4	04/21/04	--	--	--	6.70-6.76	9.6, 5.1	-147, -143
MW-4	08/11/04	1.5	ND<0.1	10	6.00	9.7, 12.4	146, 351

TABLE 4
HISTORICAL WATER ANALYSES FOR NATURAL ATTENUATION PARAMETERS
WORLD OIL STATION NO. 24
13013 SAN PABLO AVENUE
SAN PABLO, CALIFORNIA

Well Number	Sample Date	Ferrous Iron SM3500-D (mg/L)	Nitrate EPA 300.0 (mg/L)	Sulfate EPA 300.0 (mg/L)	pH	Dissolved Oxygen (DO) (ppm)	Redox Potential (ORP) (mv)
MW-4	11/04/04	--	--	--	6.47-6.58	8.41, 8.62	-29, -12
MW-4	02/10/05	--	--	--	6.54, 6.71	10.94, 12.42	376, 222
MW-5	11/14/01	0.16	ND<0.1	ND<1	7.2	0.5, 0.5	-111, -116
MW-5	02/06/02	1.5	ND<0.1	17	6.6-6.7	1.0, 1.2	-37, -45
MW-5	05/02/02	1.4	ND<0.1	13	6.68-6.69	0.8, 0.6	-84, -87
MW-5	07/31/02	0.47	ND<0.1	23	6.7-7.3	0.6, 1.1	-71, -44
MW-5	10/30/02	--	--	--	--	6.47,8.59	54,16
MW-5	01/30/03	1.5	ND<0.1	19	7.26-7.35	6.8, 6.4	-78, -31
MW-5	06/03/03	1.5	ND<0.1	18	6.17-6.42	8.1,6.5	-95, -129
MW-5	07/29/03	1.5	ND<0.1	18	6.76-7.31	12.2, 13.7	-100, -124
MW-5	10/30/03	1.6	ND<0.1	1.2	6.77-6.84	5.7, 2.8	-126, -152
MW-5	01/14/04	1.6	ND<0.1	22	6.20-6.41	8.1, 9.2	-76, -90
MW-5	04/21/04	--	--	--	6.67-6.82	6.7, 4.8	-158, -161
MW-5	08/11/04	0.60	ND<0.1	21	6.03-6.09	8.9, 6.9	92, 39
MW-5	11/04/04	--	--	--	6.44-6.73	6.47, 8.59	-54, -16
MW-5	02/10/05	1.2	0.16	19	6.65, 6.76	14.35, 12.04	236, -67
MW-6	11/14/01	ND<0.1	0.40	17	7.1 - 7.2	1.2, 1.0	-11, -12
MW-6	02/06/02	ND<0.1	1.30	42	6.6	1.2	-22, 52
MW-6	05/02/02	0.35	0.55	36	6.76-6.87	3.1, 5.0	17, 18
MW-6	07/31/02	0.66	0.33	14	6.7-7.2	1.9, 1.6	52, -55
MW-6	10/30/02	1.0	--	7.5	6.65-6.74	3.6, 2.1	-66, -54
MW-6	01/30/03	0.12	1.7	27	7.25-7.53	5.9, 6.2	93, -23
MW-6	06/03/03	ND<0.1	0.67	25	6.40-6.64	5.4,7.7	96,15
MW-6	07/29/03	ND<0.1	0.17	20	7.52-7.95	11.9, 12.6	206, 10
MW-6	10/30/03	1.3	ND<0.1	5.1	6.77-6.83	6.0, 3.8	-115, -104
MW-6	01/14/04	--	--	--	6.01-6.31	12.1, 6.1	-29, -10
MW-6	04/21/04	--	--	--	6.78-6.91	12.1, 7.8	-97, -43
MW-6	08/11/04	0.21	0.85	13	6.01-6.12	6.4, 7.5	340, 338
MW-6	11/04/04	--	--	--	6.54-6.69	7.99, 8.76	182, 145
MW-6	02/10/05	--	--	--	6.70, 6.77	12.68, 12.65	246, 340
MW-7	10/30/02	ND<0.1	--	100	6.59-7.36	4.6, 4.2	216, 212
MW-7	01/30/03	ND<0.1	6.6	50	7.25-7.37	7.5, 7.0	65, 74
MW-7	06/03/03	ND<0.1	6.2	45	6.65-6.82	10.4,8.4	134,122
MW-7	07/29/03	ND<0.1	9.3	50	7.36-7.38	9.4, 8.7	-13, 27
MW-7	10/30/03	ND<0.1	4.2	53	7.07-7.20	8.1, 4.8	309, 304
MW-7	01/14/04	--	--	--	6.08-6.57	5.9, 8.0	27, 54
MW-7	04/21/04	--	--	--	6.74-6.86	10.4, 10.1	68, 80
MW-7	08/11/04	ND<0.1	10	49	6.61-6.63	12.7, 10.8	312, 391
MW-7	11/04/04	--	--	--	6.64	9.40, 9.85	208, 148
MW-7	02/10/05	--	--	--	6.68, 6.79	14.43, 11.85	330, 358

TABLE 4
HISTORICAL WATER ANALYSES FOR NATURAL ATTENUATION PARAMETERS
WORLD OIL STATION NO. 24
13013 SAN PABLO AVENUE
SAN PABLO, CALIFORNIA

Well Number	Sample Date	Ferrous Iron SM3500-D (mg/L)	Nitrate EPA 300.0 (mg/L)	Sulfate EPA 300.0 (mg/L)	pH	Dissolved Oxygen (DO) (ppm)	Redox Potential (ORP) (mv)
MW-8	10/30/02	ND<0.1	--	24	6.85-6.97	3.1, 1.9	230, 202
MW-8	01/30/03	ND<0.1	0.57	17	7.03-7.42	0.4, 4.2	-25, 2
MW-8	06/03/03	ND<0.1	0.76	13	6.81-7.10	6.3,8.5	128,107
MW-8	07/29/03	ND<0.1	0.52	12	7.38-7.43	11.7, 12.2	78, 56
MW-8	10/30/03	ND<0.1	0.31	15	6.83-7.02	5.5, 4.7	255, 199
MW-8	01/14/04	ND<0.1	0.55	16	6.33-6.52	10.4, 7.1	29, 46
MW-8	04/21/04	--	--	--	6.83-6.87	7.6, 6.7	105, 104
MW-8	08/11/04	ND<0.1	0.89	14	6.22	9.6, 11.5	412, 445
MW-8	11/04/04	--	--	--	6.81	8.77, 9.78	198, 149
MW-8	02/10/05	0.12	1.2	17	6.71, 6.86	14.28, 10.04	246, 214

Notes:
ND<0.01 = not detected above the respective limit of quantitation.
mg/L = milligrams per liter.
ppm = parts per million.
mv = millivolts.
ORP = oxidation reduetion potential.
DO and ORP values are down-hole field readings, pre and post purge (xx, xx).
pH values show the lowest to highest field readings.
-- = not analyzed/measured.

TABLE 5
HISTORICAL ADDITIONAL OXYGENATE ANALYTES
WORLD OIL STATION NO. 24
13013 SAN PABLO AVENUE
SAN PABLO, CALIFORNIA

Well Number	Sample Date	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	TBA (µg/L)
MW-1	8/11/2004	--	--	--	--
MW-1	2/10/2005	--	--	--	--
MW-2	8/11/2004	ND<2	ND<2	ND<2	ND<10
MW-2	2/10/2005	--	--	--	--
MW-3	8/11/2004	ND<40	ND<40	ND<40	ND<200
MW-3	2/10/2005	--	--	--	--
MW-4	8/11/2004	ND<2	ND<2	ND<2	ND<10
MW-4	2/10/2005	--	--	--	--
MW-5	8/11/2004	ND<8	ND<8	ND<8	ND<40
MW-5	2/10/2005	--	--	--	--
MW-6	8/11/2004	ND<2	ND<2	ND<2	ND<10
MW-6	2/10/2005	--	--	--	--
MW-7	8/11/2004	ND<2	ND<2	ND<2	ND<10
MW-7	2/10/2005	--	--	--	--
MW-8	8/11/2004	ND<2	ND<2	ND<2	ND<10
MW-8	2/10/2005	--	--	--	--
MW-9	8/11/2004	ND<2	ND<2	ND<2	ND<10
MW-9	2/10/2005	--	--	--	--

Notes:

DIPE = Di-isopropyl Ether

ETBE - Ethyl tert-butyl Ether

TAME = Tert-Amyl Methyl Ether

TBA = Tert-butanol

µg/L = micrograms per liter.

ND <10 = not detected above the respective detection limit.

-- = not analyzed/measured.

LABORATORY REPORT AND COC RECORD

AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client: World Oil Marketing Company
Project No.: NA
Project Name: WO #24
Sample Matrix: Water
Method: Ferrous Iron (SM3500)

AA Project No.: A2913165
Date Received: 02/11/05
Date Reported: 02/25/05
Units: mg/L

AA I.D. No.	Client I.D. No.	Date Sampled	Date Analyzed	DF	Results	MRL
182376	MW-8	02/10/05	02/11/05	1.0	**0.12**	0.1
182377	MW-2	02/10/05	02/11/05	1.0	<0.1	0.1
182381	MW-5	02/10/05	02/11/05	1.0	**1.2**	0.1
182382	MW-3	02/10/05	02/11/05	1.0	**2.1**	0.1

MRL: Method Reporting Limit J: Estimated Value DF: Dilution Factor

Viorel Vasile
Project Manager

American Analytics • 9765 Eton Avenue, Chatsworth, California 91311
Tel: (818) 998 - 5547 • • Fax: (818) 998 - 7258

AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client: World Oil Marketing Company
Project No.: NA
Project Name: WO #24
Sample Matrix: Water
Method: Nitrate as N (EPA 300.0)

AA Project No.: A2913165
Date Received: 02/11/05
Date Reported: 02/25/05
Units: mg/L

AA I.D. No.	Client I.D. No.	Date Sampled	Date Analyzed	DF	Results	MRL
182376	MW-8	02/10/05	02/11/05	1.0	**1.2**	0.1
182377	MW-2	02/10/05	02/11/05	1.0	**10**	0.1
182381	MW-5	02/10/05	02/11/05	1.0	**0.16**	0.1
182382	MW-3	02/10/05	02/11/05	1.0	<0.1	0.1

MRL: Method Reporting Limit J: Estimated Value DF: Dilution Factor

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AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client: World Oil Marketing Company
Project No.: NA
Project Name: WO #24
Sample Matrix: Water
Method: Sulfate (EPA 300.0)

AA Project No.: A2913165
Date Received: 02/11/05
Date Reported: 02/25/05
Units: mg/L

AA I.D. No.	Client I.D. No.	Date Sampled	Date Analyzed	DF	Results	MRL
182376	MW-8	02/10/05	02/14/05	5.0	**17**	0.5
182377	MW-2	02/10/05	02/14/05	5.0	**20**	0.5
182381	MW-5	02/10/05	02/14/05	5.0	**19**	0.5
182382	MW-3	02/10/05	02/14/05	1.0	<0.5	0.5

MRL: Method Reporting Limit J: Estimated Value DF: Dilution Factor

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AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client:	World Oil Marketing Company	**AA Project No.:**	A2913165
Project No.:	NA	**Date Received:**	02/11/05
Project Name:	WO #24	**Date Reported:**	02/25/05
Sample Matrix:	Water	**Units:**	ug/L
Method:	EPA 8260B (BTEX, MTBE)		

Date Sampled:	**02/10/05**	**02/10/05**	**02/10/05**	**02/10/05**	
Date Analyzed:	**02/14/05**	**02/14/05**	**02/14/05**	**02/14/05**	
AA ID No.:	**182375**	**182376**	**182377**	**182378**	
Client ID No.:	**QCTB**	**MW-8**	**MW-2**	**MW-7**	
Dilution Factor:	**1.0**	**1.0**	**1.0**	**1.0**	**MRL**
Compounds:					
Benzene	<0.5	<0.5	<0.5	<0.5	0.5
Ethylbenzene	<0.5	<0.5	<0.5	<0.5	0.5
Methyl tert-Butyl Ether	<2	<2	<2	<2	2
Toluene	<0.5	<0.5	<0.5	<0.5	0.5
m,p-Xylenes	<1	<1	<1	<1	1
o-Xylene	<0.5	<0.5	<0.5	<0.5	0.5

Viorel Vasile
Project Manager

AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client:	World Oil Marketing Company	**AA Project No.:**	A2913165
Project No.:	NA	**Date Received:**	02/11/05
Project Name:	WO #24	**Date Reported:**	02/25/05
Sample Matrix:	Water	**Units:**	ug/L
Method:	EPA 8260B (BTEX, MTBE)		

Date Sampled:	**02/10/05**	**02/10/05**	**02/10/05**	**02/10/05**	
Date Analyzed:	**02/14/05**	**02/14/05**	**02/14/05**	**02/14/05**	
AA ID No.:	**182379**	**182380**	**182381**	**182382**	
Client ID No.:	**MW-6**	**MW-4**	**MW-5**	**MW-3**	
Dilution Factor:	**1.0**	**1.0**	**1.0**	**20.0**	**MRL**
Compounds:					
Benzene	**1.3**	<0.5	**22**	**660**	0.5
Ethylbenzene	**0.91**	**6.5**	**150**	**1300**	0.5
Methyl tert-Butyl Ether	**3.6**	**24**	**22**	<40	2
Toluene	<0.5	**0.73**	**18**	**90**	0.5
m,p-Xylenes	<1	<1	**490**	**2600**	1
o-Xylene	<0.5	<0.5	**81**	**70**	0.5

MRL: Method Reporting Limit J: Estimated Value

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AMERICAN ANALYTICS

LABORATORY ANALYSIS RESULTS

Client: World Oil Marketing Company
Project No.: NA
Project Name: WO #24
Sample Matrix: Water
Method: Gasoline Range Org. by GC/MS

AA Project No.: A2913165
Date Received: 02/11/05
Date Reported: 02/25/05
Units: ug/L

AA I.D. No.	Client I.D. No.	Date Sampled	Date Analyzed	DF	Results	MRL
182375	QCTB	02/10/05	02/14/05	1.0	<100	100
182376	MW-8	02/10/05	02/14/05	1.0	<100	100
182377	MW-2	02/10/05	02/14/05	1.0	<100	100
182378	MW-7	02/10/05	02/14/05	1.0	<100	100
182379	MW-6	02/10/05	02/14/05	1.0	**460**	100
182380	MW-4	02/10/05	02/14/05	1.0	**2600**	100
182381	MW-5	02/10/05	02/14/05	1.0	**10000**	100
182382	MW-3	02/10/05	02/14/05	20.0	**26000**	100

MRL: Method Reporting Limit J: Estimated Value DF: Dilution Factor

Viorel Vasile
Project Manager

LABORATORY QA/QC REPORT

Client: World Oil Marketing Company
Project Name: WO #24
Method: Ferrous Iron (SM3500)
Sample ID: Reagent Blank

Project No.: NA
AA Project No.: A2913165
Date Analyzed: 02/11/05
Date Reported: 02/25/05

Compounds	Result mg/L	MRL
Ferrous Iron	<0.1	0.1

MRL: Method Reporting Limit

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AMERICAN ANALYTICS

LABORATORY QA/QC REPORT

Client: World Oil Marketing Company
Project Name: WO #24
Method: EPA 8260B (BTEX, MTBE)
Sample ID: Reagent Blank

Project No.: NA
AA Project No.: A2913165
Date Analyzed: 02/14/05
Date Reported: 02/25/05

Compounds	Result ug/L	MRL
Benzene	<0.5	0.5
Ethylbenzene	<0.5	0.5
Methyl tert-Butyl Ether	<2	2
Toluene	<0.5	0.5
m,p-Xylenes	<1	1
o-Xylene	<0.5	0.5

MRL: Method Reporting Limit

Viorel Vasile
Project Manager

LABORATORY QA/QC REPORT

Client: World Oil Marketing Company
Project Name: WO #24
Method: Gasoline Range Org. by GC/MS
Sample ID: Reagent Blank

Project No.: NA
AA Project No.: A2913165
Date Analyzed: 02/14/05
Date Reported: 02/25/05

Compounds	Result ug/L	MRL
Gasoline Range Organics	<100	100

MRL: Method Reporting Limit

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AMERICAN ANALYTICS

LABORATORY QA/QC REPORT

Client: World Oil Marketing Company
Project Name: WO #24
Method: Ferrous Iron (SM3500)
Sample ID: Laboratory Control Standard
Concentration: 0.2 mg/L

Project No.: NA
AA Project No. A2913165
Date Analyzed: 02/11/05
Date Reported: 02/25/05

Compounds	Recovered Amount (mg/L)	Recovery (%)	Acceptable Range (%)
Ferrous Iron	0.203	102.0	50.0 - 150

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AMERICAN ANALYTICS

LABORATORY QA/QC REPORT

Client: World Oil Marketing Company
Project Name: WO #24
Method: Nitrate as N (EPA 300.0)
Sample ID: Laboratory Control Standard
Concentration: 5 mg/L

Project No.: NA
AA Project No. A2913165
Date Analyzed: 02/11/05
Date Reported: 02/25/05

Compounds	Recovered Amount (mg/L)	Recovery (%)	Acceptable Range (%)
Nitrate as N	5.44	109	75 - 125

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AMERICAN ANALYTICS

LABORATORY QA/QC REPORT

Client: World Oil Marketing Company
Project Name: WO #24
Method: Sulfate (EPA 300.0)
Sample ID: Laboratory Control Standard
Concentration: 5 mg/L

Project No.: NA
AA Project No. A2913165
Date Analyzed: 02/14/05
Date Reported: 02/25/05

Compounds	Recovered Amount (mg/L)	Recovery (%)	Acceptable Range (%)
Sulfate	5.27	105	75 - 125

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AMERICAN ANALYTICS

LABORATORY QA/QC REPORT

Client: World Oil Marketing Company
Project Name: WO #24
Method: EPA 8260B (BTEX, MTBE)
Sample ID: Laboratory Control Standard
Concentration: 20 ug/L

Project No.: NA
AA Project No. A2913165
Date Analyzed: 02/14/05
Date Reported: 02/25/05

Compounds	Recovered Amount (ug/L)	Recovery (%)	Acceptable Range (%)
Benzene	16	82	65 - 135
Ethylbenzene	19	95	77 - 123
Toluene	18	90	66 - 134
o-Xylene	20	98	73 - 127

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LABORATORY QA/QC REPORT

Client: World Oil Marketing Company
Project Name: WO #24
Method: Gasoline Range Org. by GC/MS
Sample ID: Laboratory Control Standard
Concentration: 500 ug/L

Project No.: NA
AA Project No. A2913165
Date Analyzed: 02/14/05
Date Reported: 02/25/05

Compounds	Recovered Amount (ug/L)	Recovery (%)	Acceptable Range (%)
Gasoline Range Organics	487	97	48 - 152

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AMERICAN ANALYTICS

LABORATORY QA/QC REPORT

Client: World Oil Marketing Company
Project Name: WO #24
Method: EPA 8260B (BTEX, MTBE)
Sample ID: Matrix Spike
Concentration 20 ug/L

AA ID No: 182376
Project No.: NA
AA Project No. A2913165
Date Analyzed: 02/14/05
Date Reported: 02/25/05

Compounds	Result (ug/L)	Spike Recovery (%)	Dup. Result (ug/L)	Spike/Dup. Recovery (%)	RPD (%)	Accept. Rec. Range (%)
Benzene	16.1	81	16.2	81	0	50 - 150
Ethylbenzene	19.4	97	18.9	95	2	50 - 150
Methyl tert-Butyl Ether	18.6	93	18.2	91	2	50 - 150
Toluene	17.8	89	17.7	89	0	50 - 150
o-Xylene	19.4	97	19.0	95	2	50 - 150

Viorel Vasile
Project Manager

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WORLD OIL CORP.

9302 South Garfield Avenue
South Gate, CA 90280-3896
Phone(562) 928-0100 Fax(562) 928-0391

CHAIN OF CUSTODY

Analytical Laboratory: American Analytics
Lab Project: A2913165

DATE: 2-10-05
Pg 1 Of 1

SITE/STATION #: 24
SITE/STATION ADDRESS: 13013 San Pablo Ave. / Rheem Ave. - San Pablo, CA.
CONSULTANT: Wayne Perry Inc. PHONE:(714) 826-0352
ADDRESS: 8281 Commonwealth Ave, Buena Park, CA FAX:( )
PROJECT MGR. John Hundley SAMPLER NAME: Jorge Gonzalez
PROJECT # PROJECT NAME: San Pablo / Rheem
TAT: ☐ 24Hr ☐ 48Hr ☐ 72Hr ☒ Normal (5 Days) ☐ Other( )
SHIPPED VIA: ☒ Walk In ☐ Courier ☐ Fed Ex ☐ Other( )

SAMPLE ID	MATRIX	DATE	TIME	LAB ID	NUMBER OF CONTAINERS	ANALYSES REQUESTED: TPH-D/BTEX/MTBE by 8260B	TPH-D/BTEX/MTBE (8260B)	Silica Gel (if Req'd) Excess Hydrocarbons	REMARKS
QCTB	WT	2-10-05	17:30	182375	2	X			
MW-8	W		17:53	182376	6		X	X	
MW-2	W		18:03	182377	6		X	X	
MW-7	W		18:12	182378	3		X		
MW-6	W		18:19	182379	3		X		
MW-4	W		18:24	182380	3		X		
MW-5	W		18:32	182381	6		X	X	
MW-3	W		18:38	182382	6		X	X	

05 FEB 11 PM 3:

1) RELINQUISHED BY:
Printed Name: Jorge Gonzalez
Signature: Date/Time: 2-10-05

1) RECEIVED BY:
Printed Name: Wendy Clement
Signature: Date/Time: 2/11/05 1515

2) RELINQUISHED BY:
Printed Name:
Signature: Date/Time:

2) RECEIVED BY:
Printed Name:
Signature: Date/Time:

3) RELINQUISHED BY:
Printed Name:
Signature: Date/Time:

3) RECEIVED BY:
Printed Name:
Signature: Date/Time:

approved as work order 02/11/05 1615 V. Vento

WAYNE PERRY, INC. GROUNDWATER MONITORING AND SAMPLING
FIELD DATA SHEETS

GROUNDWATER SAMPLING PROCEDURES

Before purging, each well was measured twice for depth of well, depth to water, and phase-separated hydrocarbon thickness. Groundwater depths were measured using an electronic water/hydrocarbon interface probe calibrated to one hundredth of a foot. The interface probe was washed in non-phosphate soap and triple rinsed in distilled water between wells.

Purged groundwater containing dissolved- or phase-separated petroleum hydrocarbons if present was evacuated with an air lift pump or bailer. All purged groundwater was left onsite to be transported by Asbury Environmental Services and eventually processed by Demenno-Kerdoon in Compton.

Prior to sampling, wells were purged of water with a stainless steel or PVC bailer. Fast recharging wells were purged of three casing volumes of water. Slow recharging wells were purged until dry and allowed to recover for two hours or until the well recovered 80 percent of the initial water column height before sampling. Each casing volume of water was field tested for temperature, conductivity, pH, and turbidity. Measurements for dissolved oxygen and oxygen reduction potentials were collected before and after purging each well. The last casing volume of water was field tested for turbidity. Field measurement data follows this page.

Water samples were obtained using a disposable bailer equipped with a bottom emptying device and placed in laboratory supplied 40 ml VOA vials with acid preservative. Samples were sealed, labeled, and placed on ice to reduce the potential for volatilization. In addition to samples from the wells, a trip blank was prepared to verify the integrity of the sampling and laboratory procedures.

Water samples were shipped to American Analytics laboratory following chain-of-custody procedures. Groundwater samples were tested for total petroleum hydrocarbons-gasoline, benzene, toluene, ethylbenzene, xylenes, and oxygenates using EPA Test Method 8260B. The samples from wells MW-2, MW-3, MW-5 and MW-8 were also tested for the presence of sulfates and nitrates by EPA Test Method 300.0 and ferrous iron by Test Method SM3500.

WORLD OIL MARKETING COMPANY

WELL GAUGING FORM

Date: 2/10/5 ~~04-473-1b~~

Contractor Project No: 04.473

Station No.: 24 Location: 13013 San Pablo Ave / Rheem - San Pablo Ave Page 1 of 1

Contractor: *Wayne Perry, Inc.* Gauged by: Jason G. / Ramon P.

Well ID	Well Diam.	Gauging Order	Depth to Product	Depth To Water	Depth to Water (Check)	Depth to Well Bottom	Product Thickness	Length of Water Column	Comments
MW-2	4"	2	/	24.56	24.56	39.05	/	14.49	
MW-6	2"	5	/	22.50	22.50	39.52	/	17.02	
MW-1	2"	4	/	0	0	19.58	/	0	Dry well
MW-4	2"	6	/	23.08	23.08	37.55	/	14.47	
MW-3	2"	8	/	22.41	22.41	40.02	/	17.61	
MW-5	2"	7	/	22.35	22.35	39.50	/	17.15	
MW-8	2"	1	/	21.00	21.00	39.74	/	18.74	
MW-7	2"	3	/	19.92	19.92	39.50	/	19.58	

Note: Gauging order shows lowest to ~~highest concentrations~~ based on previous quarter's analytical results.

(67 gls Total) (Dur. water was PUT in a)

WORLD OIL
WELL PURGING, SAMPLING AND INSPECTION FORM

ontractor Job No. 04473

tation No. 24 Location 13013 San Pablo Ave. / Rheem Ave - San Pablo, CA Page 1 of 7

ontractor: Wayne Perry, Inc. Sampler Jorge G. Ramirez P.

ell ID: MW-8 Well Diameter: 2" Depth-to Water: 21.00

uging Date: 2-10-05 Purging Method: Bailer Depth-to-Bottom: 39.74

irging Date: Sampling Method: Disp. Bailer Water Column (ft): 18.74

mpling Date:

ELL PURGING:

lculate volume of water to purge:

2.99 gals x 3 = 8.99 gals

1 casing volume) (no. of volumes to purge) (total volume to purge

Multipliers for converting length of water column (feet) to gallons:

Well Diameter	Multiplier	Well Diameter	Multiplier	Well Diameter	Multiplier
1 inch	0.04	3 inch	0.37	6 inch	1.47
2 inch	0.16	4 inch	0.65		

other radius (squared) x 0.163

rge Start Time: 15:30 Water Qual. Instrument Used: Horiba

	1	2	3		COMMENTS
ME	15:32	15:34	15:36		
MP (°C)	18.4	18.4	18.4		
	6.71	6.85	6.86		
NDUCTIVITY	0.101	0.102	0.102		
RBIDITY	999.0	999.0	999.0		
solved Oxygen	10.79	12.40	12.92		
y.Reduct. Potent.	213	188	181		
LS. REMOVED	3	3	3		Total Gallons Purged 9

Pre-Purge Time 15:29 Reading 14.28 Post-Recharge Time 17:54 Reading 10.04

DOX Pre-Purge Time 15:29 Reading 246 Post-Recharge Time 17:54 Reading 214

Well Dewater? No Water Storage/Disposal Method Poly No. of Drums Used

LL SAMPLING:

npling Time 17:53 Recharge Level 22.35

oratory: American Analytics 82608

lyses Requested: TPH-G ✓ BTEX ✓ MTBE ✓ Oxygenates Other + Sulfate / Nitrate @ Ferrous iron.

Blank ID OCTB 17:30 Duplicate ID Equipment Blank ID Poly

LL INSPECTION:

l Cap Secured ✓ Well Cap Locked ✓ Traffic Cover Secured ✓

l Box Cleaned and Free of Water ✓

air/Replacement Performed O

air/Replacement Needed O

WORLD OIL
WELL PURGING, SAMPLING AND INSPECTION FORM

ontractor Job No. 04-473

ation No. 24 Location 13013 San Pablo Ave - San Pablo Page 2 of 7

ontractor: *Wayne Perry, Inc.* Sampler [illegible]

ell ID: MW-2	**Well Diameter:** 4"	**Depth-to Water:** 24.56
uging Date: 2-10-05	**Purging Method:** Bailer	**Depth-to-Bottom:** 39.05
rging Date: ↓	**Sampling Method:** Disp. Bailer	**Water Column (ft):** 14.49
mpling Date: ↓		

ELL PURGING:

lculate volume of water to purge:

9.41 gals x 3 = 28.2 gals

1 casing volume) (no. of volumes to purge) (total volume to purge

Multipliers for converting length of water column (feet) to gallons:

Well Diameter	Multiplier	Well Diameter	Multiplier	Well Diameter	Multiplier
1 inch	0.04	3 inch	0.37	6 inch	1.47
2 inch	0.16	4 inch	0.65		

other radius (squared) x 0.163

rge Start Time: 15:49 Water Qual. Instrument Used: Horiba

	1	2	3		COMMENTS
IE	15:51	15:53			Dry on 2 casing
MP (°C)	19.3	19.1			
	6.18	6.30			
NDUCTIVITY	67.3	78.4			
RBIDITY	720.0	999.0		409.0	
solved Oxygen	10.35	10.42			
/.Reduct. Potent.	252	250			
LS. REMOVED	9.41	6			Total Gallons Purged 16

Pre-Purge Time 15:48 Reading 14.09 Post-Recharge Time 18:04 Reading 13.68

DOX Pre-Purge Time 15:48 Reading 261 Post-Recharge Time 18:04 Reading 395

Well Dewater? yes Water Storage/Disposal Method Poly No. of Drums Used

LL SAMPLING:

mpling Time 18:03 Recharge Level 25.60

oratory: *American Analytics*

lyses Requested: TPH-G ✓ BTEX ✓ MTBE ✓ 8260B Oxygenates ___ Other Sulfate/nitrate & Ferrous iron

Blank ID ___ Duplicate ID ___ Equipment Blank ID ___

LL INSPECTION:

l Cap Secured ✓ Well Cap Locked ✓ Traffic Cover Secured ✓

l Box Cleaned and Free of Water ✓

air/Replacement Performed Q

air/Replacement Needed Q

WellPurgeandSample.2003
WORLD OIL-Other

FEB. 15. 2005 11:10AM WAYNE PERRY INC. NO. 008 P. 69

WORLD OIL
WELL PURGING, SAMPLING AND INSPECTION FORM

Contractor Job No. 04.473

Station No. 24 Location 13013 San Pablo Ave / Rear San Pablo Ave Page 3 of 7

Contractor: *Wayne Perry, Inc.* Sampler Jorge G. / Ramiro P.

Well ID: MW-7 Well Diameter: 2" Depth-to Water: 19.92

Gauging Date: 2-10-05 Purging Method: Bailer Depth-to-Bottom: 39.50

Purging Date: Sampling Method: Disp. Bailer Water Column (ft): 19.58

Sampling Date:

WELL PURGING:

Calculate volume of water to purge:

3.13 gals x 3 = 9.39 gals

(1 casing volume) (no. of volumes to purge) (total volume to purge)

Multipliers for converting length of water column (feet) to gallons:

Well Diameter	Multiplier	Well Diameter	Multiplier	Well Diameter	Multiplier
1 inch	0.04	3 inch	0.37	6 inch	1.47
2 inch	0.16	4 inch	0.65		

other radius (squared) x 0.163

Purge Start Time: 16:07 Water Qual. Instrument Used: Horiba

	1	2	3		COMMENTS
TIME	16:09	16:11	16:13		
TEMP (°C)	18.3	18.5	18.5		
pH	6.68	6.78	6.79		
CONDUCTIVITY	84.4	84.9	85.2		
TURBIDITY	999.0	999.0	999.0	504.0	
Dissolved Oxygen	9.86	11.77	11.65		
Oxy.Reduct. Potent.	301	287	280		
GALS. REMOVED	3.13	3.13	3.13		Total Gallons Purged 9.5

DO Pre-Purge Time 16:06 Reading 14.43 Post-Recharge Time 18:13 Reading 11.85

REDOX Pre-Purge Time 16:06 Reading 330 Post-Recharge Time 18:13 Reading 358

Did Well Dewater? No Water Storage/Disposal Method Poly No. of Drums Used

WELL SAMPLING:

Sampling Time 18:12 Recharge Level 20.15

Laboratory: *American Analytics*

Analyses Requested: TPH-G ✓ BTEX ✓ MTBE ✓ 8260 Oxygenates Other

Trip Blank ID Duplicate ID Equipment Blank ID

WELL INSPECTION:

Well Cap Secured ✓ Well Cap Locked ✓ Traffic Cover Secured ✓

Well Box Cleaned and Free of Water ✓

Repair/Replacement Performed None

Repair/Replacement Needed None

WORLD OIL
WELL PURGING, SAMPLING AND INSPECTION FORM

Contractor Job No. 04.473

Station No. 24 Location 13013 San Pablo Ave/Rheem Dr. - San Pablo, Ca Page 4 of 7

Contractor: *Wayne Perry, Inc.* Sampler Jorge G./Ramiro P.

Well ID: MW-6 Well Diameter: 2" Depth-to Water: 22.50

Gauging Date: 7-10-05 Purging Method: Bailer Depth-to-Bottom: 39.52

Purging Date: Sampling Method: Disp. Bailer Water Column (ft): 17.02

Sampling Date:

WELL PURGING:

Calculate volume of water to purge:

2.72 gals x 3 = 8.16 gals

(1 casing volume) (no. of volumes to purge) (total volume to purge

Multipliers for converting length of water column (feet) to gallons:

Well Diameter	Multiplier	Well Diameter	Multiplier	Well Diameter	Multiplier
1 inch	0.04	3 inch	0.37	6 inch	1.47
2 inch	0.16	4 inch	0.66		

other radius (squared) x 0.163

Purge Start Time: 16:23 Water Qual. Instrument Used: Horiba

	1	2	3		COMMENTS
TIME	16:25	16:27	16:29		
TEMP (°C)	19.1	19.2	19.2		
pH	6.70	6.77	6.76		
CONDUCTIVITY	86.6	93.1	97.8		
TURBIDITY	999.0	999.0	999.0	276.0	
Dissolved Oxygen	10.34	12.33	12.18		
Oxy.Reduct. Potent.	233	207	186		
GALS. REMOVED	2.72	2.72	2.72		Total Gallons Purged 8.5

DO Pre-Purge Time 16:22 Reading 12.68 Post-Recharge Time 18:20 Reading 12.65

REDOX Pre-Purge Time 16:22 Reading 246 Post-Recharge Time 18:20 Reading 340

Did Well Dewater? No Water Storage/Disposal Method Poly No. of Drums Used

WELL SAMPLING:

Sampling Time 18:19 Recharge Level 22.60

Laboratory: *American Analytics*

Analyses Requested: TPH-G ✓ BTEX ✓ MTBE ✓ Oxyganates Other 8260B.

Trip Blank ID Duplicate ID Equipment Blank ID

WELL INSPECTION:

Well Cap Secured ✓ Well Cap Locked ✓ Traffic Cover Secured ✓

Well Box Cleaned and Free of Water ✓

Repair/Replacement Performed None

Repair/Replacement Needed None

WORLD OIL
WELL PURGING, SAMPLING AND INSPECTION FORM

Contractor Job No. 04.473

Station No. 24 Location 13013 San Pablo Ave / Alameda - San Pablo, CA Page 5 of 7

Contractor: *Wayne Perry, Inc.* Sampler: Jason Ca / Ramiro P.

Well ID: MW-4 Well Diameter: 2" Depth-to Water: 23.08

Gauging Date: 2.10.05 Purging Method: Bailer Depth-to-Bottom: 37.55

Purging Date: Sampling Method: Disp. Bailer Water Column (ft): 14.47

Sampling Date:

WELL PURGING:

Calculate volume of water to purge:

2.31 gals x 3 = 6.94 gals

(1 casing volume) (no. of volumes to purge) (total volume to purge

Multipliers for converting length of water column (feet) to gallons:

Well Diameter	Multiplier	Well Diameter	Multiplier	Well Diameter	Multiplier
1 inch	0.04	3 inch	0.37	8 inch	1.47
2 inch	0.16	4 inch	0.65		

other radius (squared) x 0.163

Purge Start Time: 16:41 Water Qual. Instrument Used: Horiba

	1	2	3		COMMENTS
TIME	16:43	16:45	16:47		
TEMP (°C)	18.7	18.8	18.8		
pH	6.54	6.66	6.71		
CONDUCTIVITY	0.107	0.105	0.109		
TURBIDITY	999.0	999.0	999.0	197.0	
Dissolved Oxygen	10.04	10.90	10.91		
Oxy.Reduct. Potent.	134	-57	-81		
GALS. REMOVED	2.31	2.37	2.31		Total Gallons Purged 7

DO Pre-Purge Time 16:40 Reading 10.94 Post-Recharge Time 18:25 Reading 12.42

REDOX Pre-Purge Time 16:40 Reading 376 Post-Recharge Time 18:25 Reading 222

Did Well Dewater? No Water Storage/Disposal Method Poly No. of Drums Used

WELL SAMPLING:

Sampling Time 18:24 Recharge Level 23.15

Laboratory: *American Analytics*

Analyses Requested: TPH-G ✓ BTEX ✓ MTBE ✓ Oxygenates 8260B Other

Trip Blank ID Duplicate ID Equipment Blank ID

WELL INSPECTION:

Well Cap Secured ✓ Well Cap Locked ✓ Traffic Cover Secured

Well Box Cleaned and Free of Water ✓

Repair/Replacement Performed O

Repair/Replacement Needed O

WORLD OIL
WELL PURGING, SAMPLING AND INSPECTION FORM

Contractor Job No. 04-473

Station No. 24 Location 13013 San Pablo Ave/Rheem Ave - San Pablo, Ca Page 6 of 7

Contractor: *Wayne Perry, Inc.* Sampler Jorge G. Ramiro P.

Well ID: MW-5 Well Diameter: 2" Depth-to Water: 22.35

Gauging Date: 2-10-05 Purging Method: Bail Depth-to-Bottom: 39.50

Purging Date: Sampling Method: Disp. Bailer Water Column (ft): 17.15

Sampling Date:

WELL PURGING:

Calculate volume of water to purge:

2.74 gals x 3 = 8.23 gals

(1 casing volume) (no. of volumes to purge) (total volume to purge)

Multipliers for converting length of water column (feet) to gallons:

Well Diameter	Multiplier	Well Diameter	Multiplier	Well Diameter	Multiplier
1 inch	0.04	3 inch	0.37	6 inch	1.47
2 inch	0.16	4 inch	0.65		

other radius (squared) x 0.163

Purge Start Time: 17:04 Water Qual. Instrument Used: Horiba

	1	2	3		COMMENTS
TIME	17:06	17:08	17:10		Sheen at Bailer
TEMP (°C)	18.7	18.7	18.7		
pH	6.65	6.71	6.76		
CONDUCTIVITY	0.122	0.124	0.125		
TURBIDITY	999.0	999.0	999.0	335.0	
Dissolved Oxygen	10.01	8.22	8.31		
Oxy.Reduct. Potent.	-9	-55	-75		
GALS. REMOVED	2.74	2.74	2.74		Total Gallons Purged 8.5

DO Pre-Purge Time 17:03 Reading 14.35 Post-Recharge Time 18:33 Reading 12.04

REDOX Pre-Purge Time 17:03 Reading 236 Post-Recharge Time 18:33 Reading -67

Did Well Dewater? No Water Storage/Disposal Method Poly No. of Drums Used

WELL SAMPLING:

Sampling Time 18:32 Recharge Level 22.64

Laboratory: *American Analytics*

Analyses Requested: TPH-G ✓ BTEX ✓ MTBE ✓ 8260B Oxygenates Other Sulfate / Nitrate & ferrous iron.

Trip Blank ID Duplicate ID Equipment Blank ID

WELL INSPECTION:

Well Cap Secured ✓ Well Cap Locked ✓ Traffic Cover Secured ✓

Well Box Cleaned and Free of Water ✓

Repair/Replacement Performed O

Repair/Replacement Needed O

WORLD OIL
WELL PURGING, SAMPLING AND INSPECTION FORM

Contractor Job No. 04.473

Station No. 24 Location 13013 San Pablo Ave / Mesa Blvd San Pablo, CA. Page 7 of 7

Contractor: *Wayne Perry, Inc.* Sampler Douglas Manino

Well ID: MW-3 Well Diameter: 2" Depth-to Water: 22.41

Gauging Date: 2.10.05 Purging Method: Bailer Depth-to-Bottom: 40.02

Purging Date: ↓ Sampling Method: Disp Bailer Water Column (ft): 17.61

Sampling Date: ↓

WELL PURGING:

Calculate volume of water to purge:

2.81 gals x 3 = 8.45 gals

(1 casing volume) (no. of volumes to purge) (total volume to purge

Multipliers for converting length of water column (feet) to gallons:

Well Diameter	Multiplier	Well Diameter	Multiplier	Well Diameter	Multiplier
1 inch	0.04	3 inch	0.37	6 inch	1.47
2 inch	0.16	4 inch	0.65		

other radius (squared) x 0.163

Purge Start Time: 17:21 Water Qual. Instrument Used: Horiba

	1	2	3		COMMENTS
TIME	17:23	17:25	17:27		
TEMP (°C)	19.1	19.1	19.1		
pH	6.49	6.62	6.67		
CONDUCTIVITY	0.097	0.098	0.104		
TURBIDITY	999.0	999.0	999.0	260.0	
Dissolved Oxygen	9.64	10.61	10.68		
Oxy.Reduct. Potent.	163	47	-6		
GALS. REMOVED	2.81	2.81	2.81		Total Gallons Purged 8.5

DO Pre-Purge Time 17:20 Reading 14.83 Post-Recharge Time 18:39 Reading 7.89

REDOX Pre-Purge Time 17:20 Reading 289 Post-Recharge Time 18:39 Reading -67

Did Well Dewater? No Water Storage/Disposal Method Poly No. of Drums Used

WELL SAMPLING:

Sampling Time 18:38 Recharge Level 22.88

Laboratory: *American Analytics*

Analyses Requested: TPH-G ✓ BTEX ✓ MTBE ✓ 8260B Oxygenates Other Sulfate, Nitrate & Ferrous Iron

Trip Blank ID Duplicate ID Equipment Blank ID

WELL INSPECTION:

Well Cap Secured ✓ Well Cap Locked ✓ Traffic Cover Secured ✓

Well Box Cleaned and Free of Water ✓

Repair/Replacement Performed 0

Repair/Replacement Needed 0

WellPurgeandSample.2003
WORLD OIL-Other

WORLD OIL CORP.

9302 South Garfield Avenue
South Gate, CA 90280-3896
Phone(562) 928-0100 Fax(562) 928-0391

CHAIN OF CUSTODY

Analytical Laboratory: American Analytics
Lab Project:

DATE: 2-10-05
Pg 1 Of 1

SITE/STATION #: 24
SITE/STATION ADDRESS: 13013 San Pablo Ave / Rheem Ave - San Pablo, CA.
CONSULTANT: Wayne Perry Inc. PHONE: (714) 826-0352
ADDRESS: 8281 Commonwealth Ave, Buena Park, CA. FAX: ( )
PROJECT MGR. John Hundley SAMPLER NAME: Jorge Gonzalez
PROJECT #: PROJECT NAME: San Pablo / Rheem
TAT: ☐ 24Hr ☐ 48Hr ☐ 72Hr ☒ Normal (5 Days) ☐ Other( )
SHIPPED VIA: ☒ Walk In ☐ Courier ☐ Fed Ex ☐ Other( )

SAMPLE ID	MATRIX	DATE	TIME	LAB ID	NUMBER OF CONTAINERS	ANALYSES REQUESTED: TPH-G/BTEX/MTBE by 8260B		TPH-G/BTEX/MTBE (8260B)		Sulfate/Nitrate & Bromide/Iodide					REMARKS
QCTB	WT	2-10-05	17:30		2	X									
MW-8	W		17:53		6			X		X					
MW-2	W		18:03		6			X		X					
MW-7	W		18:12		3			X							
MW-6	W		18:19		3			X							
MW-4	W		18:24		3			X							
MW-5	W		18:32		6			X		X					
MW-3	W		18:38		6			X		X					

05 FEB 11 PM 3:15

1) RELINQUISHED BY:
Printed Name: Jorge Gonzalez
Signature: Date/Time: 2-10-05
1) RECEIVED BY:
Printed Name:
Signature: Date/Time: 2/11/05 1515

2) RELINQUISHED BY:
Printed Name:
Signature: Date/Time:
2) RECEIVED BY:
Printed Name:
Signature: Date/Time:

3) RELINQUISHED BY:
Printed Name:
Signature: Date/Time:
3) RECEIVED BY:
Printed Name:
Signature: Date/Time:

WASTE DISPOSAL DOCUMENTS

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

Manifest Document No. 0 0 0 0 1

2. Page 1 of 1

3. Generator's Name and Mailing Address
WORLD OIL MARKETING COMPANY #24
9302 S. GARFIELD AVE
SOUTH GATE CA 90280
4. Generator's Phone ( )

5. Transporter 1 Company Name
ASBURY ENVIRONMENTAL SERVICES

6. US EPA ID Number
CAD028277036

A. State Transporter's ID

B. Transporter 1 Phone 800 974-4491

7. Transporter 2 Company Name

8. US EPA ID Number

C. State Transporter's ID

D. Transporter 2 Phone

9. Designated Facility Name and Site Address
DEMENNO / KERDOON
2000 NORTH ALAMEDA STREET
COMPTON CA 90222

10. US EPA ID Number
CAT080013352

E. State Facility's ID

F. Facility's Phone 310 537-7100

11. WASTE DESCRIPTION	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a. NON HAZARDOUS WASTE LIQUID (PURGED GROUNDWATER)	1	TT	-70-	G
b.				
c.				
d.				

G. Additional Descriptions for Materials Listed Above

H. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
USE PPE
EMERGENCY CONTACT : CHEMTREC 1-800-424-9300
SITE: 13013 SAN PABLO / RHEEMAVE, SAN PABLO, CA

GENERATOR

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

As representative for World Oil

Printed/Typed Name | Signature | Date: Month 3 Day 7 Year 05

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: STANLEY D. WILES | Signature: Stanley D Wiles | Date: Month 3 Day 7 Year 05

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Date: Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name: Gregory Woods | Signature | Date: Month 3 Day 8 Year 05

NON-HAZARDOUS WASTE

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

Manifest Document No. 4 2 3 1 5

2. Page 1 of 1

3. Generator's Name and Mailing Address
WORLD OIL MARKETING COMPANY #24 Attn: John Hundley
9302 S. GARFIELD AVE
SOUTH GATE CA 90280

4. Generator's Phone 562-928-0100 x215

5. Transporter 1 Company Name
ASBURY ENVIRONMENTAL SERVICES

6. US EPA ID Number
CAD028277036

A. State Transporter's ID

B. Transporter 1 Phone 800 974-4495

7. Transporter 2 Company Name

8. US EPA ID Number

C. State Transporter's ID

D. Transporter 2 Phone

9. Designated Facility Name and Site Address
DKE/LEVINE-RICHMOND TERMINAL CORP.
402 WRIGHT AVENUE
RICHMOND CA 94804

10. US EPA ID Number

E. State Facility's ID

F. Facility's Phone
800 727-2879

11. WASTE DESCRIPTION	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a. NON HAZARDOUS WASTE LIQUID (PURGED GROUNDWATER)	001	TT	35	G
b.				
c.				
d.				

GENERATOR

G. Additional Descriptions for Materials Listed Above
11A) 350112-04

H. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
USE PPE
EMERGENCY CONTACT: CHEMTREC 1-800-424-9300
SITE: 13013 SAN PABLO / RHEEM AVE, SAN PABLO, CA
Prior House PO#

16. GENERATOR'S CERTIFICATION: I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.
On behalf of World Oil Marketing Company

Printed/Typed Name	Signature	Date Month	Day	Year
William Bik	William Bik	1	27	05

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month	Day	Year
William Bik	William Bik	1	27	05

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month	Day	Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in Item 19.
On behalf of DKE/LEVINE Richmond Terminal

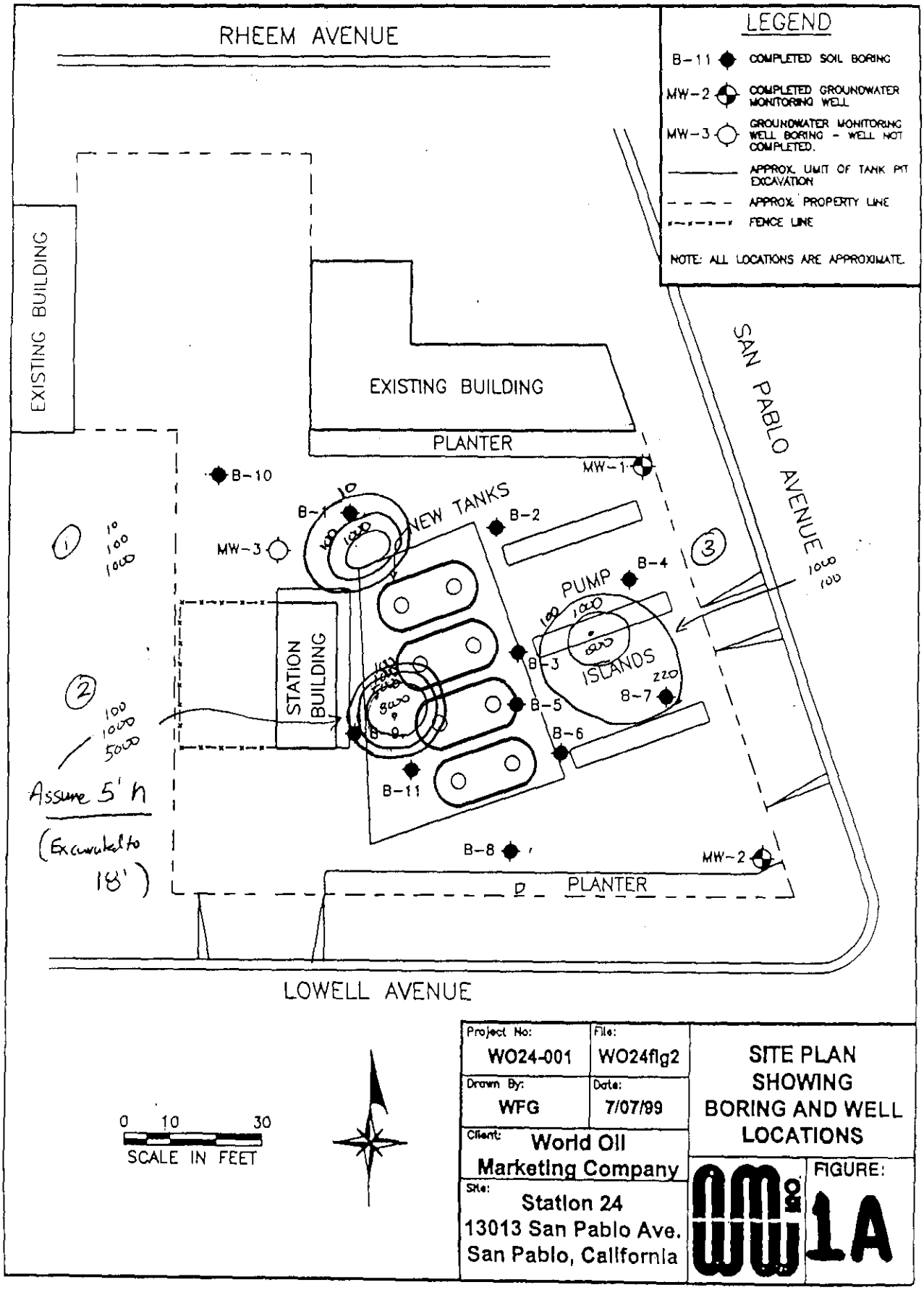
Printed/Typed Name	Signature	Date Month	Day	Year
S. Wiles	S. Wiles	1	27	05

NON-HAZARDOUS WASTE

APPENDIX C

TPHG IN SOIL ISOCON MAPS AND VOLUMETRIC CALCULATIONS

SOIL - TPH @ 10'-20'



Mass of TPHg in Soil
10-20 feet Below Ground Surface (bgs)

1. Region 1

a. Isocon Lines on Figure 1A Show That:
Average TPHg Concentration for Area $A_{1,000}$:
$[A_{1,000}]$ = 1,000 mg/kg = 1,000 ppm

Area of Isocon Area $A_{1,000} = (\Pi * d_1 * d_2)/4$
$A_{1,000} = (\Pi * 11\ ft * 7\ ft)/4 = 60.45\ ft^2$

$V_{1,000} = A_{1,000}$ * Depth of Isocon Area
Depth of Isocon Area = 20 ft – 10 ft = 10 ft

$V_{1,000} = 60.45\ ft^2 * 10\ ft = 604.5\ ft^3$

Pounds (lbs) TPHg Found Within $V_{1,000}$:
lbs TPHg = $(V_{1,000})$*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = $(604.5\ ft^3)$*(1,000 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in $V_{1,000}$ = 66.50 lbs

b. Isocon Lines on Figure 1A Show That:
Average TPHg Concentration for Area A_{100}:
$[A_{100}]$ = (1,000 mg/kg + 100 mg/kg)/2 = 550 mg/kg = 550 ppm

Area of Isocon Area $A_{100} = (\Pi * d_1 * d_2)/4$
$A_{100} = (\Pi * 17.5\ ft * 12.5\ ft)/4 = 171.72\ ft^2 - A_{1,000} = 171.72\ ft^2 - 60.45\ ft^2$
$A_{100} = 111.27\ ft^2$

$V_{100} = A_{100}$ * Depth of Isocon Area
Depth of Isocon Area = 20 ft – 10 ft = 10 ft

$V_{100} = 111.27\ ft^2 * 10\ ft = 1112.74\ ft^3$

Pounds (lbs) TPHg Found Within V_{100}:
lbs TPHg = (V_{100})*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = $(1112.74\ ft^3)$*(550 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in V_{100} = 67.3 lbs

c. Isocon Lines on Figure 1A Show That:
Average TPHg Concentration for Area A_{10}:
$[A_{10}]$ = (100 mg/kg + 10 mg/kg)/2 = 55 mg/kg = 55 ppm

Area of Isocon Area $A_{10} = (\Pi * d_1 * d_2)/4$
$A_{10} = (\Pi * 25\ ft * 20\ ft)/4 = 392.5\ ft^2 - [A_{100} + A_{1,000}] = 392.5\ ft^2 - 171.7\ ft^2$
$A_{10} = 220.8\ ft^2$

$V_{10} = A_{10}$ * Depth of Isocon Area
Depth of Isocon Area = 20 ft – 10 ft = 10 ft

$V_{10} = 220.8\ ft^2 * 10\ ft = 2208\ ft^3$

Pounds (lbs) TPHg Found Within V_{10}:
lbs TPHg = (V_{10})*(TPHg Concentration in ppm)*(Soil Density) *$(10^{-6}$/ ppm)
lbs TPHg = $(2208\ ft^3)$*(55 ppm)* (110 lbs/ ft^3) *$(10^{-6}$/ ppm)

lbs TPHg in V_{10} = 13.4 lbs

Total Mass of TPHg in Region 1 from 10-20 ft bgs:

=66.5 lbs + 67.3 lbs + 13.4 lbs
=147.2 lbs TPHg

Mass of TPHg in Soil
10-20 feet Below Ground Surface (bgs)

2. Region 2

a. Isocon Lines on Figure 1A Show That:
Average TPHg Concentration for Area $A_{5,000}$:
$[A_{5,000}]$ = (8,000 mg/kg + 5,000 mg/kg)/2 = 6,500 mg/kg = 6,500 ppm

Area of Isocon Area $A_{5,000} = (\Pi * d_1 * d_2)/4$
$A_{5,000} = (\Pi * 11\ ft * 13\ ft)/4 = 112.26\ ft^2$

$V_{5,000} = A_{5,000}$ * Depth of Isocon Area
Depth of Isocon Area = 20 ft – 10 ft = 10 ft
However, assume Depth is approximately 5 ft as this location was excavated to 18 ft bgs in 1998.

$V_{5,000} = 112.26\ ft^2 * 5\ ft = 561.28\ ft^3$

Pounds (lbs) TPHg Found Within $V_{5,000}$:
lbs TPHg = $(V_{5,000})$*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = $(561.28\ ft^3)$*(6,500 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in $V_{5,000}$ = 401.3 lbs

b. Isocon Lines on Figure 1A Show That:
Average TPHg Concentration for Area $A_{1,000}$:
$[A_{1,000}]$ = (5,000 mg/kg + 1,000 mg/kg)/2 = 3,000 mg/kg = 3,000 ppm

Area of Isocon Area $A_{1,000} = (\Pi * d_1 * d_2)/4$
$A_{1,000} = (\Pi * 15\ ft * 17.5\ ft)/4 = 206.06\ ft^2 - A_{5,000} = 206.06\ ft^2 - 112.25\ ft^2$
$A_{1,000} = 93.81\ ft^2$

$V_{1,000} = A_{1,000}$ * Depth of Isocon Area
Depth of Isocon Area = 20 ft – 10 ft = 10 ft
However, assume Depth is approximately 5 ft as this location was excavated to 18 ft bgs in 1998.

$V_{1,000} = 93.81\ ft^2 * 5\ ft = 469.04\ ft^3$

Pounds (lbs) TPHg Found Within $V_{1,000}$:
lbs TPHg = $(V_{1,000})$*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = $(469.04\ ft^3)$*(3,000 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in $V_{1,000}$ = 154.8 lbs

c. Isocon Lines on Figure 1A Show That:
Average TPHg Concentration for Area A_{100}:
$[A_{100}]$ = (1,000 mg/kg + 100 mg/kg)/2 = 550 mg/kg = 550 ppm

Area of Isocon Area $A_{100} = (\Pi * d_1 * d_2)/4$
$A_{100} = (\Pi * 20\ ft * 22.5\ ft)/4 = 353.25\ ft^2 - [A_{1,000} + A_{5,000}] = 353.25\ ft^2 - 206.06\ ft^2$
$A_{100} = 147.2\ ft^2$

$V_{100} = A_{100}$ * Depth of Isocon Area
Depth of Isocon Area = 20 ft – 10 ft = 10 ft
However, assume Depth is approximately 5 ft as this location was excavated to 18 ft bgs in 1998.

$V_{100} = 147.2\ ft^2 * 5\ ft = 735.94\ ft^3$

Pounds (lbs) TPHg Found Within V_{100}:
lbs TPHg = (V_{100})*(TPHg Concentration in ppm)*(Soil Density) *$(10^{-6}$/ ppm)
lbs TPHg = $(735.94\ ft^3)$*(550 ppm)* (110 lbs/ ft^3) *$(10^{-6}$/ ppm)

lbs TPHg in V_{100} = 44.5 lbs

Total Mass of TPHg in Region 2 from 10-20 ft bgs:

=401.3 lbs + 154.8 lbs + 44.5 lbs
=600.6 lbs TPHg

Mass of TPHg in Soil
10-20 feet Below Ground Surface (bgs)

3. Region 3

a. Isocon Lines on Figure 1A Show That:
Average TPHg Concentration for Area $A_{1,000}$:
$[A_{1,000}]$ = (1,500 mg/kg + 1,000 mg/kg)/2 = 1,250 mg/kg = 1,250 ppm

Area of Isocon Area $A_{1,000} = (\Pi * d_1 * d_2)/4$
$A_{1,000} = (\Pi * 12.5 \text{ ft} * 15 \text{ ft})/4 = 147.19 \text{ ft}^2$

$V_{1,000} = A_{1,000}$ * Depth of Isocon Area
Depth of Isocon Area = 20 ft – 10 ft = 10 ft

$V_{1,000} = 147.19 \text{ ft}^2 * 10 \text{ ft} = 1471.9 \text{ ft}^3$

Pounds (lbs) TPHg Found Within $V_{1,000}$:
lbs TPHg = $(V_{1,000})$*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = (1471.9 ft^3)*(1,250 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in $V_{1,000}$ = 202.4 lbs

b. Isocon Lines on Figure 1A Show That:
Average TPHg Concentration for Area A_{100}:
$[A_{100}]$ = (1,000 mg/kg + 100 mg/kg)/2 = 550 mg/kg = 550 ppm

Area of Isocon Area $A_{100} = (\Pi * d_1 * d_2)/4$
$A_{100} = (\Pi * 32.5 \text{ ft} * 25 \text{ ft})/4 = 637.8 \text{ ft}^2 - A_{1,000} = 637.81 \text{ ft}^2 - 147.19 \text{ ft}^2$
$A_{100} = 490.63 \text{ ft}^2$

$V_{100} = A_{100}$ * Depth of Isocon Area
Depth of Isocon Area = 20 ft – 10 ft = 10 ft

$V_{100} = 490.63 \text{ ft}^2 * 10 \text{ ft} = 4906.3 \text{ ft}^3$

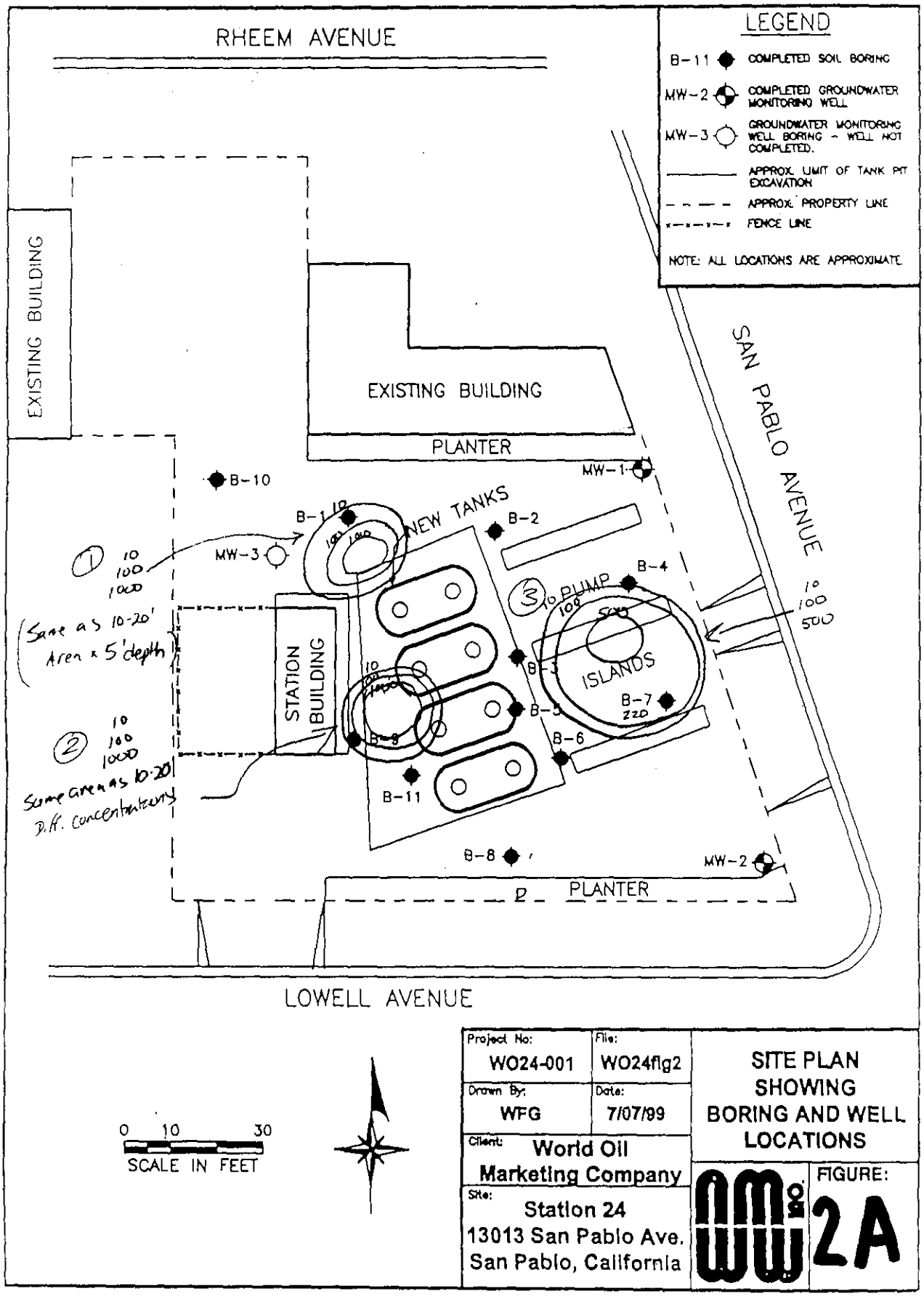
Pounds (lbs) TPHg Found Within V_{100}:
lbs TPHg = (V_{100})*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = (4690.3 ft^3)*(550 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in V_{100} = 296.8 lbs

Total Mass of TPHg in Region 3 from 10-20 ft bgs:

=202.38 lbs + 296.8 lbs
=499.18 lbs TPHg

Soil TPH @ 20-25



Mass of TPHg in Soil
20-25 feet Below Ground Surface (bgs)

1. Region 1

a. Isocon Lines on Figure 2A Show That:
Average TPHg Concentration for Area $A_{1,000}$:
$[A_{1,000}]$ = 1,000 mg/kg = 1,000 ppm

Area of Isocon Area $A_{1,000} = (\Pi * d_1 * d_2)/4$
$A_{1,000} = (\Pi * 11\ ft * 7\ ft)/4 = 60.45\ ft^2$

$V_{1,000} = A_{1,000}$ * Depth of Isocon Area
Depth of Isocon Area = 25 ft – 20 ft = 5 ft

$V_{1,000} = 60.45\ ft^2 * 5\ ft = 302.23\ ft^3$

Pounds (lbs) TPHg Found Within $V_{1,000}$:
lbs TPHg = $(V_{1,000})$*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = $(302.23\ ft^3)$*(1,000 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in $V_{1,000}$ = 33.3 lbs

b. Isocon Lines on Figure 2A Show That:
Average TPHg Concentration for Area A_{100}:
$[A_{100}]$ = (1,000 mg/kg + 100 mg/kg)/2 = 550 mg/kg = 550 ppm

Area of Isocon Area $A_{100} = (\Pi * d_1 * d_2)/4$
$A_{100} = (\Pi * 17.5\ ft * 12.5\ ft)/4 = 171.72\ ft^2 - A_{1,000} = 171.72\ ft^2 - 60.45\ ft^2$
$A_{100} = 111.27\ ft^2$

$V_{100} = A_{100}$ * Depth of Isocon Area
Depth of Isocon Area = 25 ft – 20 ft = 5 ft

$V_{100} = 111.27\ ft^2 * 5\ ft = 556.35\ ft^3$

Pounds (lbs) TPHg Found Within V_{100}:
lbs TPHg = (V_{100})*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = $(556.35\ ft^3)$*(550 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in V_{100} = 33.7 lbs

c. Isocon Lines on Figure 2A Show That:
Average TPHg Concentration for Area A_{10}:
$[A_{10}]$ = (100 mg/kg + 10 mg/kg)/2 = 55 mg/kg = 55 ppm

Area of Isocon Area $A_{10} = (\Pi * d_1 * d_2)/4$
$A_{10} = (\Pi * 25\ ft * 20\ ft)/4 = 392.5\ ft^2 - [A_{100} + A_{1,000}] = 392.5\ ft^2 - 171.7\ ft^2$
$A_{10} = 220.8\ ft^2$

$V_{10} = A_{10}$ * Depth of Isocon Area
Depth of Isocon Area = 25ft – 20 ft = 5 ft

$V_{10} = 220.8\ ft^2 * 5\ ft = 1{,}104\ ft^3$

Pounds (lbs) TPHg Found Within V_{10}:
lbs TPHg = (V_{10})*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = (1,104 ft^3)*(55 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in V_{10} = 6.7 lbs

Total Mass of TPHg in Region 1 from 20-25 ft bgs:

=33.3 lbs + 33.7 lbs + 6.7 lbs
=73.7 lbs TPHg

Mass of TPHg in Soil
20-25 feet Below Ground Surface (bgs)

2. Region 2

a. Isocon Lines on Figure 2A Show That:
Average TPHg Concentration for Area $A_{1,000}$:
$[A_{1,000}]$ = 1,000 mg/kg = 1,000 ppm

Area of Isocon Area $A_{1,000} = (\Pi * d_1 * d_2)/4$
$A_{1,000} = (\Pi * 11\ ft * 13\ ft)/4 = 112.26\ ft^2$

$V_{1,000} = A_{1,000}$ * Depth of Isocon Area
Depth of Isocon Area = 25 ft – 20 ft = 5 ft

$V_{1,000} = 112.26\ ft^2 * 5\ ft = 561.28\ ft^3$

Pounds (lbs) TPHg Found Within $V_{1,000}$:
lbs TPHg = $(V_{1,000})$*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = $(561.28\ ft^3)$*(1,000 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in $V_{1,000}$ = 61.7 lbs

b. Isocon Lines on Figure 2A Show That:
Average TPHg Concentration for Area A_{100}:
$[A_{100}]$ = (1,000 mg/kg + 100 mg/kg)/2 = 550 mg/kg = 550 ppm

Area of Isocon Area $A_{100} = (\Pi * d_1 * d_2)/4$
$A_{100} = (\Pi * 15\ ft * 17.5\ ft)/4 = 206.06\ ft^2 - A_{1,000} = 206.06\ ft^2 - 112.25\ ft^2$
$A_{100} = 93.81\ ft^2$

$V_{100} = A_{100}$ * Depth of Isocon Area
Depth of Isocon Area = 25 ft – 20 ft = 5 ft

$V_{100} = 93.81\ ft^2 * 5\ ft = 469.04\ ft^3$

Pounds (lbs) TPHg Found Within V_{100}:
lbs TPHg = (V_{100})*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = $(469.04\ ft^3)$*(550 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in V_{100} = 28.4 lbs

c. Isocon Lines on Figure 2A Show That:
Average TPHg Concentration for Area A_{10}:
$[A_{10}]$ = (100 mg/kg + 10 mg/kg)/2 = 55 mg/kg = 55 ppm

Area of Isocon Area $A_{10} = (\Pi * d_1 * d_2)/4$
$A_{10} = (\Pi * 20\ ft * 22.5\ ft)/4 = 353.25\ ft^2 - [A_{100} + A_{1,000}] = 353.25\ ft^2 - 206.06\ ft^2$
$A_{10} = 147.2\ ft^2$

$V_{10} = A_{10}$ * Depth of Isocon Area
Depth of Isocon Area = 25 ft – 20 ft = 5 ft

$V_{10} = 147.2\ ft^2 * 5\ ft = 735.94\ ft^3$

Pounds (lbs) TPHg Found Within V_{10}:
lbs TPHg = (V_{10})*(TPHg Concentration in ppm)*(Soil Density) *$(10^{-6}$/ ppm)
lbs TPHg = $(735.94\ ft^3)$*(55 ppm)* (110 lbs/ ft^3) *$(10^{-6}$/ ppm)

lbs TPHg in V_{10} = 4.5 lbs

Total Mass of TPHg in Region 2 from 20-25 ft bgs:

=61.7 lbs + 28.4 lbs + 4.5 lbs
=94.6 lbs TPHg

Mass of TPHg in Soil
20-25 feet Below Ground Surface (bgs)

3. Region 3

a. Isocon Lines on Figure 2A Show That:
Average TPHg Concentration for Area A_{500}:
$[A_{500}]$ = 500 mg/kg = 500 ppm

Area of Isocon Area $A_{500} = (\Pi * d_1 * d_2)/4$
$A_{500} = (\Pi * 12.5\ ft * 10\ ft)/4 = 98.13\ ft^2$

V_{500} = A_{500} * Depth of Isocon Area
Depth of Isocon Area = 25 ft – 20 ft = 5 ft

$V_{500} = 98.13\ ft^2 * 5\ ft = 490.63\ ft^3$

Pounds (lbs) TPHg Found Within V_{500}:
lbs TPHg = (V_{500})*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = (490.63 ft^3)*(1,250 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in V_{500} = 27.0 lbs

b. Isocon Lines on Figure 2A Show That:
Average TPHg Concentration for Area A_{100}:
$[A_{100}]$ = (500 mg/kg + 100 mg/kg)/2 = 300 mg/kg = 300 ppm

Area of Isocon Area $A_{100} = (\Pi * d_1 * d_2)/4$
$A_{100} = (\Pi * 27.5\ ft * 30\ ft)/4 = 647.63\ ft^2 - A_{500} = 647.63\ ft^2 - 98.13\ ft^2$
$A_{100} = 549.5\ ft^2$

V_{100} = A_{100} * Depth of Isocon Area
Depth of Isocon Area = 25 ft – 20 ft = 5 ft

$V_{100} = 549.5\ ft^2 * 5\ ft = 2{,}747.5\ ft^3$

Pounds (lbs) TPHg Found Within V_{100}:
lbs TPHg = (V_{100})*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = (2,747.5 ft^3)*(300 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in V_{100} = 90.7 lbs

c. Isocon Lines on Figure 2A Show That:
Average TPHg Concentration for Area A_{10}:
$[A_{10}]$ = (100 mg/kg + 10 mg/kg)/2 = 55 mg/kg = 55 ppm

Area of Isocon Area $A_{10} = (\Pi * d_1 * d_2)/4$
$A_{10} = (\Pi * 36\ ft * 32.5\ ft)/4 = 918.45\ ft^2 - [A_{100} + A_{500}] = 918.45\ ft^2 - 647.63\ ft^2$
$A_{10} = 270.83\ ft^2$

$V_{10} = A_{10}$ * Depth of Isocon Area
Depth of Isocon Area = 25 ft – 20 ft = 5 ft

$V_{10} = 270.83\ ft^2 * 5\ ft = 1{,}354.13\ ft^3$

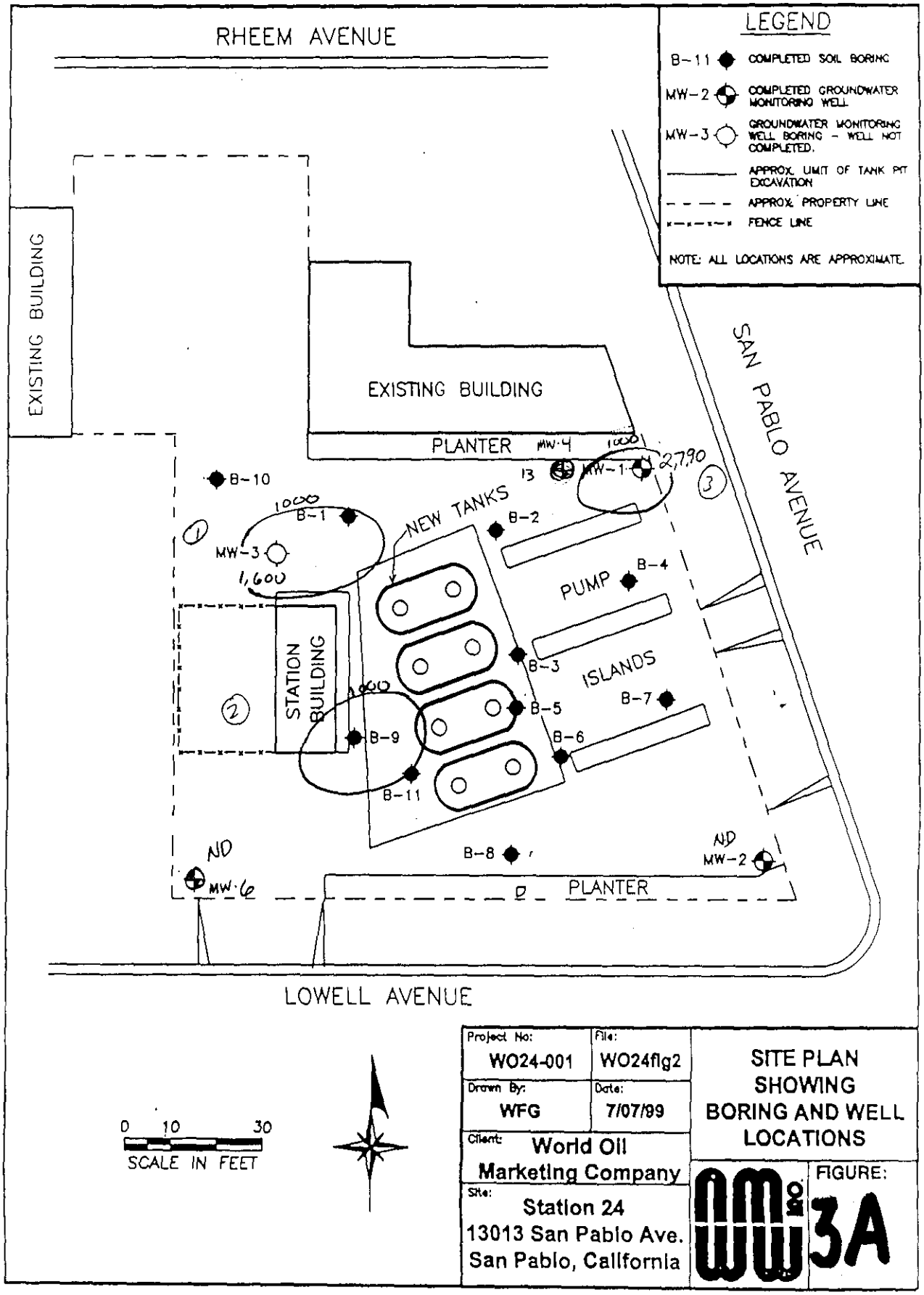
Pounds (lbs) TPHg Found Within V_{10}:
lbs TPHg = (V_{10})*(TPHg Concentration in ppm)*(Soil Density) *$(10^{-6}$/ ppm)
lbs TPHg = $(1{,}354.13\ ft^3)$*(55 ppm)* (110 lbs/ ft^3) *$(10^{-6}$/ ppm)

lbs TPHg in V_{10} = 8.2 lbs

Total Mass of TPHg in Region 3 from 20-25 ft bgs:

=27.0 lbs + 90.7 lbs + 8.2 lbs
=125.9 lbs TPHg

Soil TPH @ 25'-30'



Project No:	File:	SITE PLAN SHOWING BORING AND WELL LOCATIONS
WO24-001	WO24fig2	
Drawn By: WFG	Date: 7/07/99	
Client: World Oil Marketing Company		
Site: Station 24, 13013 San Pablo Ave., San Pablo, California		FIGURE: 3A

Mass of TPHg in Soil
25-30 feet Below Ground Surface (bgs)

1. Region 1

a. Isocon Lines on Figure 3A Show That:
Average TPHg Concentration for Area $A_{1,000}$:
$[A_{1,000}]$ = (1,600 mg/kg + 1,000 mg/kg)/2 = 1,300 mg/kg = 1,300 ppm

Area of Isocon Area $A_{1,000} = (\Pi * d_1 * d_2)/4$
$A_{1,000} = (\Pi * 20\ ft * 32.5\ ft)/4 = 510.25\ ft^2$

$V_{1,000} = A_{1,000}$ * Depth of Isocon Area
Depth of Isocon Area = 30 ft – 25 ft = 5 ft

$V_{1,000} = 510.25\ ft^2 * 5\ ft = 2{,}551.25\ ft^3$

Pounds (lbs) TPHg Found Within $V_{1,000}$:
lbs TPHg = $(V_{1,000})$*(TPHg Concentration in ppm)*(Soil Density) *$(10^{-6}$/ ppm)
lbs TPHg = $(2{,}551.25\ ft^3)$*(1,300 ppm)* (110 lbs/ ft^3) *$(10^{-6}$/ ppm)

lbs TPHg in $V_{1,000}$ = 364.8 lbs

Total Mass of TPHg in Region 1 from 25-30 ft bgs:

=364.8 lbs TPHg

Mass of TPHg in Soil
25-30 feet Below Ground Surface (bgs)

2. Region 2

a. Isocon Lines on Figure 3A Show That:
Average TPHg Concentration for Area $A_{1,000}$:
$[A_{1,000}]$ = 1,000 mg/kg = 1,000 ppm

Area of Isocon Area $A_{1,000} = (\Pi * d_1 * d_2)/4$
$A_{1,000} = (\Pi * 30\ ft * 20\ ft)/4 = 471.0\ ft^2$

$V_{1,000} = A_{1,000}$ * Depth of Isocon Area
Depth of Isocon Area = 30 ft – 25 ft = 5 ft

$V_{1,000} = 471.0\ ft^2 * 5\ ft = 2{,}355\ ft^3$

Pounds (lbs) TPHg Found Within $V_{1,000}$:
lbs TPHg = $(V_{1,000})$*(TPHg Concentration in ppm)*(Soil Density) *(10^{-6}/ ppm)
lbs TPHg = $(2{,}355\ ft^3)$*(1,000 ppm)* (110 lbs/ ft^3) *(10^{-6}/ ppm)

lbs TPHg in $V_{1,000}$ = 259.1 lbs

Total Mass of TPHg in Region 2 from 25-30 ft bgs:

=259.1 lbs TPHg

Mass of TPHg in Soil
25-30 feet Below Ground Surface (bgs)

3. Region 3

a. Isocon Lines on Figure 3A Show That:
Average TPHg Concentration for Area $A_{1,000}$:
$[A_{1,000}]$ = (2,790 mg/kg + 1,000 mg/kg)/2 = 1,895 mg/kg = 1,895 ppm

Area of Isocon Area $A_{1,000} = (\Pi * d_1 * d_2)/4$
$A_{1,000} = (\Pi * 22\ ft * 12.5\ ft)/4 = 215.87\ ft^2$

$V_{1,000} = A_{1,000}$ * Depth of Isocon Area
Depth of Isocon Area = 30 ft – 25 ft = 5 ft

$V_{1,000} = 215.87\ ft^2 * 5\ ft = 1,079.37\ ft^3$

Pounds (lbs) TPHg Found Within $V_{1,000}$:
lbs TPHg = $(V_{1,000})$*(TPHg Concentration in ppm)*(Soil Density) *$(10^{-6}$/ ppm)
lbs TPHg = $(1,079.37\ ft^3)$*(1,895 ppm)* (110 lbs/ ft^3) *$(10^{-6}$/ ppm)

lbs TPHg in $V_{1,000}$ = 225 lbs

Total Mass of TPHg in Region 3 from 25-30 ft bgs:

=225 lbs TPHg

Mass of TPHg in Soil
10-30 feet Below Ground Surface

Region 1

10-20 ft : 147.2 lbs TPHg
20-25 ft : 73.7 lbs TPHg
25-30 ft : 364.8 lbs TPHg

Total 10-30 ft : 147.2 lbs + 73.7 lbs + 364.8 lbs

= 585.7 lbs TPHg

Region 2

10-20 ft : 600.6 lbs TPHg
20-25 ft : 94.6 lbs TPHg
25-30 ft : 259.1 lbs TPHg

Total 10-30 ft : 600.6 lbs + 94.6 lbs + 259.1 lbs

= 954.3 lbs TPHg

Region 3

10-20 ft : 499.18 lbs TPHg
20-25 ft : 125.9 lbs TPHg
25-30 ft : 225 lbs TPHg

Total 10-30 ft : 499.18 lbs + 125.9 lbs + 225 lbs

= 850.08 lbs TPHg

Total

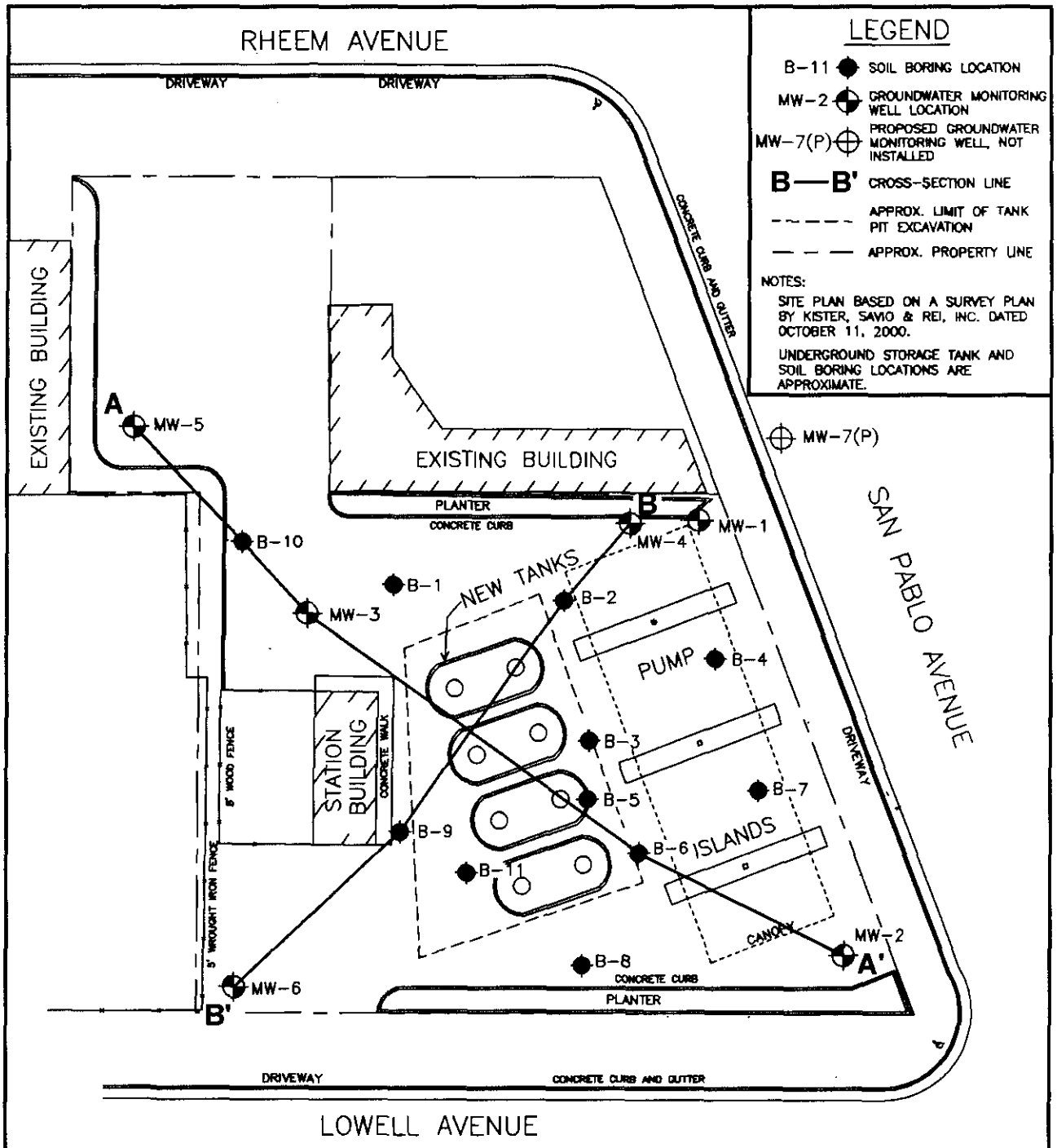
Region 1 : 585.7 lbs TPHg
Region 2 : 954.3 lbs TPHg
Region 3 : 850.08 lbs TPHg

Total : 585.7 lbs + 954.3 lbs + 850.08 lbs

= 2,390.08 lbs TPHg

APPENDIX D

CROSS-SECTIONS PREPARED BY NMWW, INC.

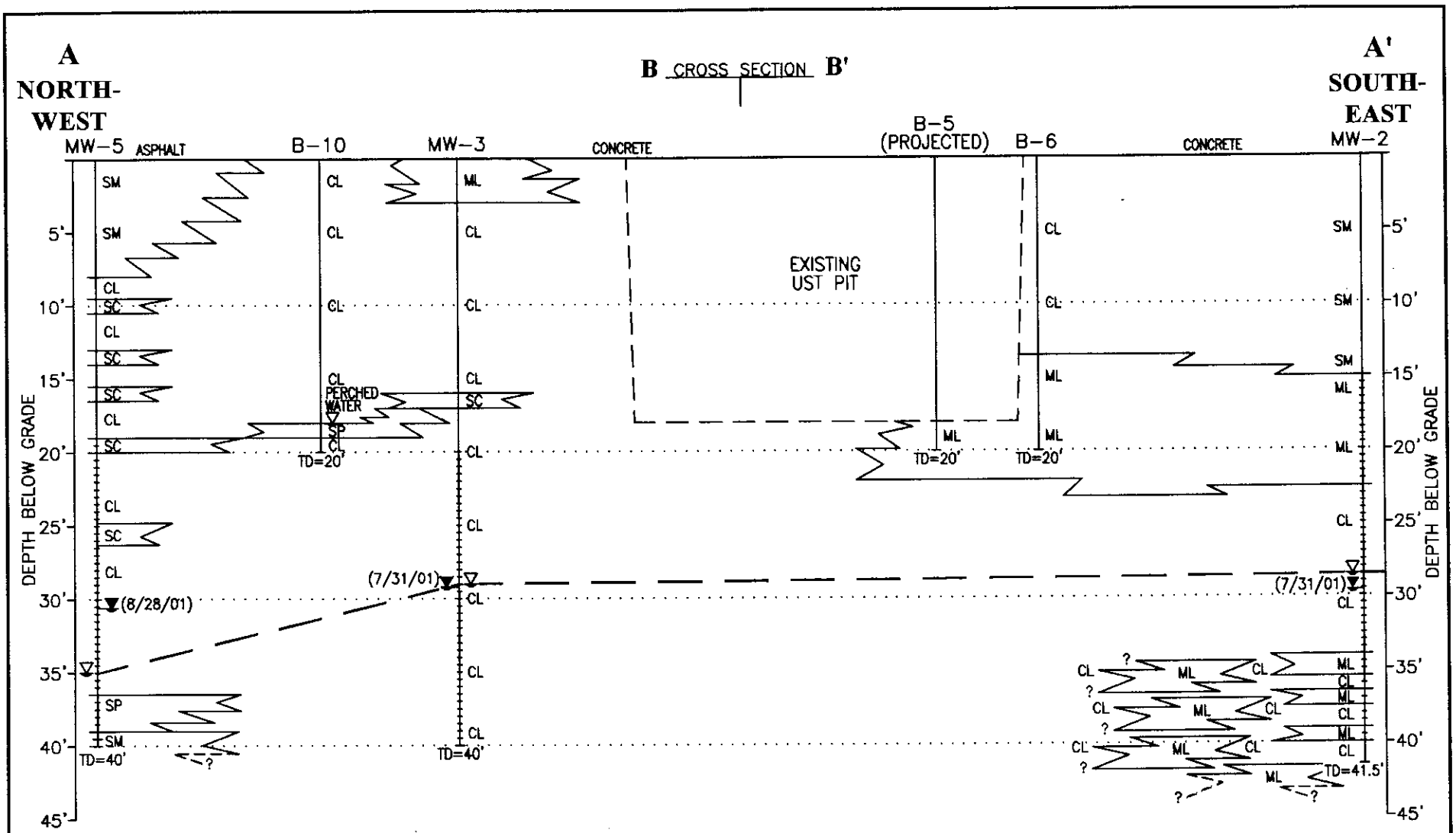


0 10 30
SCALE IN FEET

Project No: WO24-006	File: WO24006fig2
Drawn By: WFG	Date: 10/17/01
Client: World Oil Marketing Company	
Site: Station 24 13013 San Pablo Ave. San Pablo, California	

SITE PLAN SHOWING CROSS-SECTION LINES

FIGURE: **2**



EXPLANATION:

D3-B-3' ← BORING/WELL NUMBER

GROUND SURFACE

SM ← USCS SOIL DESCRIPTION

? ← LITHOLOGIC BOUNDARY AND QUERY WHERE INFERRED

▼ STABILIZED GROUNDWATER (DATE GAUGED)

▽ FIRST ENCOUNTERED GROUNDWATER

← WELL SCREEN INTERVAL

← TOTAL BORING DEPTH

USCS LITHOLOGY SYMBOLS:

SW	WELL GRADED SAND
SP	POORLY GRADED SAND
SM	SILTY SAND
SC	SANDY CLAY
CL	CLAY
ML	SILT

NOTE:
THIS DRAWING PRESENTS ONE INTERPRETATION ONLY; OTHER INTERPRETATIONS ARE POSSIBLE.

VERTICAL EXAGGERATION 2:1

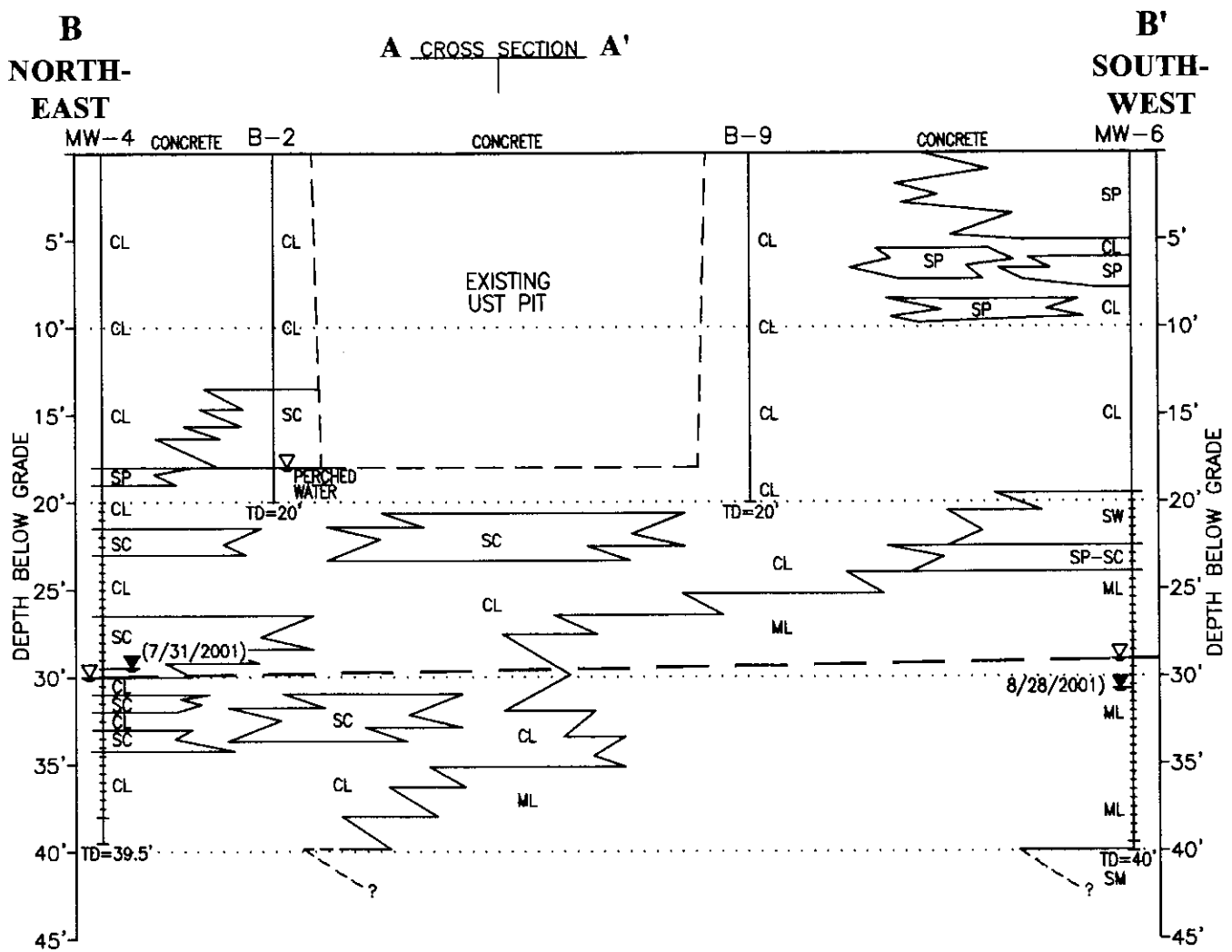
HORIZONTAL SCALE: 0 20 40

VERTICAL SCALE: 0 10 20

Project No: WO24-006	File: WO24006fig5
Drawn By: AJK/WFG	Date: 11/03/01
Client: World Oil Marketing Company	
Site: Station 24, 13013 San Pablo Ave., San Pablo, California	

CROSS-SECTION
A - A'

FIGURE: 5



EXPLANATION:

D3-B-3' ← BORING/WELL NUMBER

GROUND SURFACE

SM ← USCS SOIL DESCRIPTION

? ← LITHOLOGIC BOUNDARY AND QUERY WHERE INFERRED

▼ STABILIZED GROUNDWATER (DATE GAUGED)

▽ FIRST ENCOUNTERED GROUNDWATER

← WELL SCREEN INTERVAL

← TOTAL BORING DEPTH

USCS LITHOLOGY SYMBOLS:

SW	WELL GRADED SAND
SP	POORLY GRADED SAND
SM	SILTY SAND
SC	SANDY CLAY
CL	CLAY
ML	SILT

NOTE:
THIS DRAWING PRESENTS ONE INTERPRETATION ONLY; OTHER INTERPRETATIONS ARE POSSIBLE.

HORIZONTAL SCALE: 0 20 40

VERTICAL EXAGGERATION 2:1

VERTICAL SCALE: 0 10 20

Project No: WO24-006	File: WO24006fig6
Drawn By: AJK/WFG	Date: 11/03/01
Client: World Oil Marketing Company	
Site: Station 24 13013 San Pablo Ave. San Pablo, California	

CROSS-SECTION
B - B'

FIGURE: 6